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THE RUBBER AGE

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An Improved Method for the Determination of Total Sulfur in Rubber

By M. Levin and S. Collier

The method for the determination of total sulfur in rubber which was devised by Walters and Tuttle[2], has been used for a number of years in the laboratory of the Bureau of Standards. It has been shown to give results which are as accurate as those obtained by other methods[3]. However the desirability of decreasing the time required and the amount of reagents and number used has been realized for some time. In addition it was felt that the salts occluded by the barium sulfate precipitate should be corrected for in the most accurate work.

According to the original method, 0.5 gram of rubber is treated with 20 cc. of concentrated nitric acid saturated with bromine. The mixture is allowed to stand in a covered crucible for one hour without heating; then on the steam bath for one hour, after which the cover is removed and the nitric acid is evaporated off. The residue is fused with a mixture of sodium carbonate and potassium nitrate.

Some time ago the method was changed by reducing to 10 cc. the amount of nitric acid, and by heating the uncovered crucible for only one hour, part of the nitric acid was evaporated off. The remaining acid was neutralized by the addition of considerable excess of sodium carbonate, making it unnecessary to use potassium nitrate.

Recent work on the determination of sulfur in petroleum oils has shown that 5 cc. of concentrated nitric acid saturated with bromine is sufficient for the complete combustion of as much as 2 grams of oil by the above fusion method[4]. All of the acid which did not react with the oil was neutralized by the excess of soda, and the mixture was not evaporated until after the soda was added. Therefore it appeared certain that this amount of acid would be sufficient for the combustion of only 0.5 gram of rubber, but the experimental work described below was undertaken to test this.

Experimental Work

In the analysis of rubber it was found that 5 cc. of the nitric acid-bromine mixture did not oxidize all the sulfur of a 0.5 gram sample, no matter how prolonged the digestion. The results obtained by using varying amounts of nitric acid-bromine mixture and varying the time of heating on the steam bath are given in Table I.

TABLE I

DETERMINATION OF SULFUR UNDER DIFFERENT CONDITIONS

Amount of nitric acid-bromidne mixture	5 cc.	10 cc.	5 cc.
Time of heating, on the steam bath	1 hour	1 hour	4 hour
Percentage of Sulfur found	10.89	11.34	11.18
	10.34	11.41	11.05
	10.76	11.42	
	10.96	11.45	
	10.89	11.48	
	10.34		

The addition of 4 or 5 drops of bromine to 5 cc. nitric acid-bromine mixture prevented the loss of free sulfur, and the results obtained as given, were the same as those by the older method. Three determinations gave the following percentages of sulfur: 11.42, 11.48, 11.55.

Method Finally Adopted

Place 0.5 gram of rubber in a 75 cc. porcelain crucible. Treat with 5 cc. of nitric acid-bromine mixture, 5 drops of bromine in addition, cover the crucible with a watch glass, and let it stand one hour in the cold. Place on the steam bath and after heating for one hour, remove the crucible and allow it to cool. Carefully add, in small portions by means of a small glass spatula, 5 grams of sodium carbonate (weighed to 0.1 gram). The watch glass is to be raised only high enough to permit of the introduction of the spatula. The carbonate is allowed to slide down the side of the crucible, and not directly into the acid. Rinse the watch glass with 2 or 3 cc. of hot distilled water and stir the mixture thoroughly with a glass rod. Digest for a few minutes, spread the mixture halfway up the side of the crucible to facilitate drying, and dry on the steam-bath. Fuse the mixture by heating either over a sulfur-free flame or in a muffle furnace, the temperature of which should be determined by a pyrometer and regulated by a rheostat.

If a flame is used, place the crucible in an inclined position on a wire triangle and start the ignition over a low flame. It is necessary to hold the edge of the crucible with tongs. The tendency for the rubber to burn too briskly is controlled by judicious use of the stirring rod with which the burning portion is scraped away from the rest. When part of the mass is burned white, a fresh portion is worked into it, and so on until all of the organic matter is destroyed. Toward the last half of the operation the flame should be increased somewhat, but it is never necessary to heat the crucible to redness. With care a crucible can be used for at least ten or twelve fusions.

When a furnace is to be used the crucible should be covered with a watch glass to prevent loss by spattering. The crucible is set on a low tripod made from iron or copper wire with the ends bent down. Several of these crucibles can be placed in an iron tray which will protect the lining of the muffle from any fusion mixture if a crucible should break. The rate of heating the muffle should be approximately as follows:

Total Time (min.)	5	10	15	20	30	40	50	60	70	80	90	95	100	110
Temp. (°C)	130	320	345	350	370	390	410	430	450	470	490	525	595	640

Allow the crucible to cool, place it in a 400 cc. breaker, add 200 cc. of distilled water, and digest on the steam bath for two hours, stirring the solution occasionally. Too long digestion may cause loss of sulfur by conversion of barium carbonate into sulfate. Filter the solution into a 400 cc. beaker, and wash the residue thoroughly with hot water. Add

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[2] Waters and Tuttle, B. S. Tech. Paper No. 174. See also Jour. Ind. & Eng. Chem. 3, 734-735, (1911).

[3] Tuttle & Issacs, B. S. Tech. Paper No. 45, 1915.

[4] Waters, B. S. Tech. Paper No. 177, 19 (1920); J. Ind. & Eng. Chem, 12, 482-485, 612.

sufficient concentrated hydrochloric acid to neutralize the excess carbonates, using Congo red paper as an indicator, and add 2 cc. in excess. Dilute the solution to 300 cc., heat on the steam bath, add 10 cc. of hot 10 per cent barium chloride solution, and allow to stand over night. Filter off the precipitate, wash, and ignite in the usual way.

Sources of Error Due to Occlusion

Even if all of the sulfur in a sample of rubber is converted into sodium sulfate, the percentage calculated from the weight of barium sulfate found will not be correct unless an allowance is made for occluded salts. The amount of occlusion depends

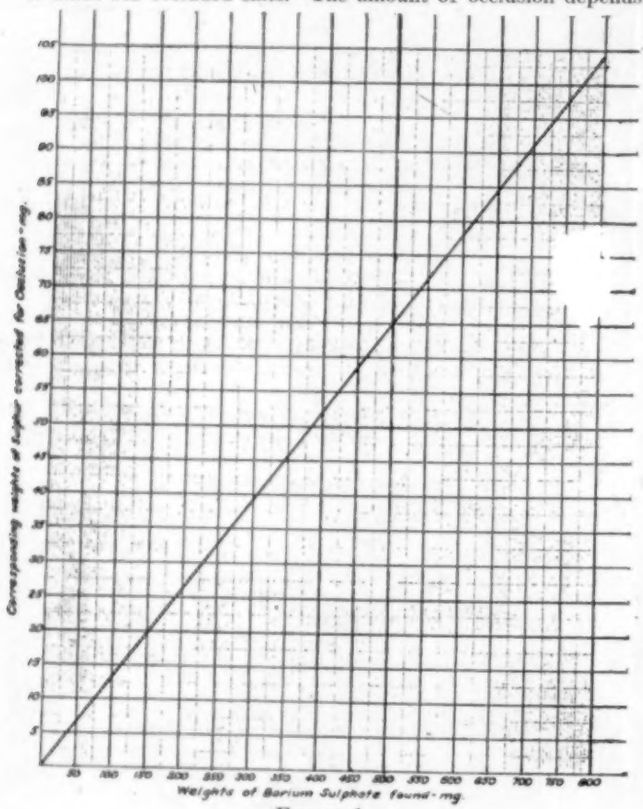

FIGURE 1

upon the nature and concentration of the salts in solution, on the acidity, and on the rate at which the barium chloride is added. It is not necessary to discuss the subject here because it is gone into very fully by Allen and Johnston[5] and Johnston and Adams. The latter authors suggest, as a convenient way to obtain the correction for occlusion, the precipitation of barium sulfate from solutions containing known amounts of soluble salts and free acid, to which have been added definite weights of sodium sulfate dried at 200 deg. C. for two hours. The differences between the weights of barium sulfate found and those calculated are the corrections.

In the determination of sulfur in rubber, the aqueous extract of the melt contains, after acidifying, hydrochloric acid and sodium sulfate, nitrate and chloride. All of these, except the first, will vary in amount according to the composition of the sample of rubber; the greater the percentage of combustible matter, the less nitrate will be left and the greater the quantity of chloride formed when the extract is acidified.

Corrections for Occlusion

The corrections for occlusion were determined by using varying amounts of a standard sodium sulfate solution, so that the amounts of barium sulfate that would be met with in rubber analysis could be obtained. The solution was of such a strength that 1 cc. contained 0.01 gram of anhydrous sodium sulfate, equivalent to 0.01642 gram of barium sulfate. The purity of the salt was determined by diluting and acidifying 5 cc. of the standard solution and precipitating the barium sulfate in the usual manner. The amount of barium sulfate found was in agreement with the theoretical amount.

To a solution of 5 grams of sodium carbonate 3 cc. of concentrated nitric acid was added. The excess sodium carbonate was neutralized with concentrated hydrochloric acid and 2 cc. in excess added. Now the desired aliquot portion of the standard sodium sulfate solution was added and the volume made up to 300 cc. The barium sulfate was precipitated and determined in the usual manner. The weights of barium sulfate were corrected for the impurities found by blank tests on the reagents. The differences between the weights of barium sulfate found and the theoretical amounts are the desired corrections for occlusion. The corrections found when working under the conditions stated above are slightly over 6 per cent of the barium sulfate. When the found and corrected weights of barium sulfate are plotted a straight line is obtained. The weights of barium sulfate found when plotted against the corresponding corrected weights of sulfur, as in Figure 1, gives a graph from which the value for sulfur may easily be read.

Summary

The method described is an improvement over previous methods for determining total sulfur in rubber goods in that;

(1) Considerable time is saved.

(2) There is a saving of reagents.

(3) More accurate results are obtained by correcting for occlusion.

The authors desire to thank C. E. Waters, whose suggestions and work of a similar nature on oils formed the basis of this work.

[5] J. Amer. Chem. Soc. *32*, 588-617 (1910).
[6] J. Amer. Chem. Soc. *33*, 829-845 (1911).

Concerning Cotton

Inasmuch as cotton is so closely allied with rubber in the manufacture of many articles many members of the rubber industry will undoubtedly be interested in "Cotton Facts" recently issued by the Shepperson Publishing Company, New York. This work compiled and edited by Alfred B. Shepperson and revised and enlarged by C. W. Shepperson-Bull contains a complete review of cotton.

The book contains within its 160 pages a complete compilation of the crops, receipts, exports and stocks of cotton together with statistics relating to home and foreign consumption, visible supply, prices and acreage. In addition to the foregoing the cotton mill statistics of the United States, Europe, India, etc., the reports of condition of growing cotton crops and the cotton acreage and yield of each state and county of the South are given. Not only is the American product discussed but considerable space is given to the Indian, Egyptian, Russian and other varieties of cotton. The book is replete with statistics concerning the crop throughout the world and has also a number of diagrams illustrating the points under discussion.

Rubber Exports from Brazil

Crude rubber exports from Brazil continued to decline, the total shipments during February, 1921, amounting to 4,240,179 pounds as against 8,162,264 pounds in February, 1920, a decrease of 48 per cent. The United States received 2,286,083 pounds and Europe 1,954,096 pounds in February of the present year. The following table shows the various grades exported to Europe and the United States from Para and Manaos, Brazil, and Iquitos, Peru, in February, 1921:

Grades.	From Para, Brazil, to—		From Manaos, Brazil, to—		From Iquitos, Peru, to—	
	United States.	Europe.	United States.	Europe.	United States.	Europe.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Fine	1,033,184	804,224	453,423	432,612	4,248	5,730
Medium	32,744	32,409	49,601	54,692	.....	440
Coarse	348,668	89,696	116,999	44,000	1,039	4,729
Cancho	83,915	403,836	162,262	18,275	.....	2,867
Total	1,498,511	1,330,165	782,285	549,579	5,287	13,766

Proposed Tentative Specifications of the American Society for Testing Materials

The following article contains a list of the proposed tentative specifications for braided air hose for use with pneumatic tools, wrapped air hose for use with pneumatic tools, cotton, rubber-lined fire hose for public and private fire department use. These specifications were discussed at a meeting of Commitee D-11 on Rubber Products of the American Society for Testing Materials, which was held in New York City on March 28, and they were approved for reference to letter ballot of the committee. The report of this meeting will be found elsewhere in this issue. The proposed tentative specifications are as follows:

Braided Air Hose for Use with Pneumatic Tools

1. These specifications cover braided air hose for use with pneumatic hammers, drills, hoists and other devices working at not more than 125 lbs. pressure, and for vacuum cleaning outfits.

I. Manufacture

2. The hose shall consist of:
   (a) An inner rubber tube;
   (b) Reinforcement of plies of braided cotton;
   (c) An outer rubber cover;
   (d) A protective covering of wire armor or a woven cotton jacket when specified.

3. The rubber tube shall be smooth, uniform in quality and thickness, and free from injurious defects.

4. (a) The reinforcement shall consist of three plies of braided cotton evenly and firmly woven over the rubber tube. The plies of braid shall be well impregnated with a rubber compound which shall firmly join the plies to the rubber tube and rubber cover and to each other. There shall be a sufficient coating of rubber compound between the plies so as to form a distinct layer of rubber.

(b) The cotton shall be as free from unsightly defects, dirt, knots, lumps and irregularities of twist as is consistent with the best manufacturing practice.

(c) The reinforcement shall be sufficiently strong to enable the hose to successfully withstand the hydrostatic pressure test, yet at the same time be soft and pliable.

5. The rubber cover shall be uniform in quality and thickness, and free from injurious defects.

6. When extra coverings of wire armor or braided cotton are specified, they shall be applied as follows:

(a) The wire armor shall be 3/16 inch half round galvanized steel wire; wrapped with ¼ inch space between adjacent turns.

(b) The weight of the woven cotton jacket per linear foot shall be not less than the values shown in Table I.

TABLE I—WEIGHT OF WOVEN COTTON JACKETS

Size of Hose	Minimum Weight in Ounces per linear foot
3/8 Inch	3/4 Oz.
7/16 "	7/8 "
1/2 "	1 "
5/8 "	1-1/4 "
3/4 "	1-1/2 "
1 "	2 "
1-1/8 "	2-1/4 "
1-1/4 "	2-1/2 "
1-1/2 "	3 "

II. Physical Properties and Tests

7. The tests necessary to determine the physical properties which are prescribed in the following sections shall be made in accordance with the appropriate section of those numbered from 18 to 20 and 22 to 26, inclusive, of Standard Methods for Testing Cotton Rubber-Lined Hose (Serial Designation: D 15) of the American Society for Testing Materials.

8. A sample 52 inches long shall be cut from each lot of 500 feet of hose or less and subjected to the following tests.

9. (a) Test specimens shall be cut longitudinally from the sample of hose.

(b) The tensile strength shall be not less than 800 lbs. per square inch for the tube and 700 lbs. per square inch for the cover.

(c) The elongation at the breaking load for both the tube and the cover shall be such that the original 2 inch gage length of the test specimens shall stretch to not less than 8 inches for the tube and 7 inches for the cover.

(d) The set, or permanent elongation following a stretch from 2 inches to 6 inches shall not exceed 25 per cent in either tube or cover.

10. The adhesive quality of the rubber binding the plies together shall be determined by suspending a 15 pound weight from the separated end of a ply of a specimen one inch wide, cut transversely from the 16 inch sample described in Section 8. The rate of separation of the plies shall be not greater than one inch per minute.

11. From the 52 inch sample a piece of hose 3 feet long shall be taken and subjected to a hydrostatic test at the pressure specified in Table II for hose of its size.

The test shall continue for five minutes and the hose shall withstand the pressure without bursting or developing leaks or other defects. The wire armor shall be removed from armored hose prior to this test.

On large orders the number of tests may be reduced to not less than three at the option of the inspector representing the purchaser.

TABLE II—TEST PRESSURE

Inside Diameter of Hose	Pounds Per Square Inch.
3/8 Inch	950
7/16 "	925
1/2 "	900
5/8 "	850
3/4 "	750
1 "	700
1-1/8 "	650
1-1/4 "	600
1-1/2 "	550

III. Standard Dimensions and Weights

12. Unless otherwise specified, the hose shall be furnished in 50 foot lengths. The ends of each length shall be uncapped and without fittings.

13. (a) The minimum wall thickness shall be 3/32 inch for the rubber tube and 1/16 inch for the rubber cover.

(b) The gage of the tube and cover shall be measured with the braid embedded in the rubber.

IV. Marking

14. Each 50 foot length of hose shall have inlaid in the rubber cover in three places, namely, midway between the ends and within 10 feet of each end, a brand showing the name of the manufacturer, the month and year of manufacture, the trade name of the hose and the legend "Braided-Air 125 lb. A.S.T.M. Specifications".

V. Inspection and Rejection

15. (a) The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangement for inspection.

(b) The manufacturer shall afford the inspector representing the purchaser, without charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with these specifications. Tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(c) The purchaser may make the tests to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. Such tests shall be made within 60 days after date of shipment and at the expense of the purchaser.

16. (a) If the sample fails to meet the requirements of Section 9, the lot from which it was taken shall be rejected.

(b) If the sample fails to meet the requirements of either Section 10 or 11, two additional samples shall be tested. If either sample fails the lot from which it was taken shall be rejected.

17. Samples of rejected hose shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

Wrapped Air Hose for Use with Pneumatic Tools

1. These specifications cover wrapped air hose for use with pneumatic drills, hammers, hoists and other devices working at not more than 125 lbs. pressure and for vacuum cleaning outfits.

I. Manufacture

2. The hose shall consist of:
   (a) An inner rubber tube;
   (b) Reinforcement of plies of cotton duck;
   (c) An outer rubber cover;
   (d) A protective covering of wire armor or a woven cotton jacket when specified.

3. The rubber tube shall be smooth, uniform in quality and thickness, and free from injurious defects.

4. (a) The reinforcement shall consist of plies of cotton duck cut on a bias of approximately 45 degrees and applied with not less than a ½ inch lap, evenly and firmly over the tube. The number of plies shall be as specified in Table I. The plies of duck shall be well frictioned on both sides with a rubber compound which shall firmly join the plies to the rubber tube and cover and to each other.

(b) The cotton shall be as free from unsightly defects, dirt, knots, lumps and irregularities of twist as is consistent with the best manufacturing practice.

(c) The reinforcement shall be sufficiently strong to enable the hose to successfully withstand the hydrostatic pressure test and yet at the same time be soft and pliable.

TABLE I—NUMBER OF PLIES

Inside Diameter of the Hose	Number of Plies
Inches	
3/8, 7/16, 1/2, 5/8, 3/4	4
1, 1-1/8, 1-1/4, 1-1/2	5

5. The rubber cover shall be uniform in quality and thickness, and free from injurious defects.

6. The extra coverings of wire armor or woven cotton jacket when specified shall be as follows.

(a) The wire armor shall be 3/16 inch half round galvanized steel wire; wrapped with ¼ inch space between adjacent turns.

(b) The weight of the woven cotton jacket per linear foot shall be not less than that shown in Table II.

TABLE II—WEIGHT OF WOVEN COTTON JACKETS

Size of Hose	Minimum wt. in ounces per linear ft.
3/8 Inch	3/4 Oz.
7/16 "	7/8 "
1/2 "	1 "
5/8 "	1-1/4 "
3/4 "	1-1/2 "
1 "	2 "
1-1/8 "	2-1/4 "
1-1/4 "	2-1/2 "
1-1/2 "	3 "

II. Physical Properties and Tests

7. The tests necessary to determine the physical properties which are prescribed in the following sections shall be made in accordance with the appropriate section of those numbered from 18 to 20 and 22 to 26, inclusive, of Standard Methods for Testing Cotton Rubber-Lined Hose (Serial Designation D 15) of the American Society for Testing Materials.

8. A sample 52 inches long shall be cut from each lot of 500 feet of hose or less and subjected to the following tests.

9. (a) Test specimens shall be cut longitudinally from the sample of hose.

(b) The tensile strength shall be not less than 1500 lbs. per square inch for the tube and 1300 lbs. per square inch for the cover.

(c) The elongation at the breaking load for both the tube and the cover shall be such that the original 2 inch gage length of the test specimens shall stretch to not less than 10½ inches.

(d) The set, or permanent elongation, following a stretch from 2 inches to 9 inches shall not exceed 25 per cent.

10. The adhesion between the plies shall be determined by suspending a 15 pound weight from the separated end of a ply of a one inch test ring cut from the 52 inch sample described in Section 8, the force being applied radically. The rate of separation of the plies shall be not greater than one inch per minute. The test shall extend for ten minutes when the size of the test ring permits.

11. From the 52 inch sample, a piece of hose 3 feet long shall be taken and subjected to a hydrostatic test at the pressure specified in Table III for hose of its size.

The test shall continue for five minutes and the hose shall withstand the pressure without bursting or developing leaks or other defects. The wire armor shall be removed from armored hose prior to this test.

On large orders the number of tests may be reduced to not less than three at the option of the inspector representing the purchaser.

TABLE III—TEST PRESSURES

Inside Diameter of Hose	Pounds Per Square Inch
3/8 Inch	750
7/16 "	725
1/2 "	700
5/8 "	650
3/4 "	650
1 "	600
1-1/8 "	600
1-1/4 "	550
1-1/2 "	550

III. Standard Sizes and Dimensions

12. Unless otherwise specified, the hose shall be furnished in 50 foot lengths. The ends of each length shall be uncapped and without fittings.

13. The minimum thicknesses shall be 3/32 in. for the rubber tube and 1/16 in. for the rubber cover.

IV. Marking

14. Each 50 foot length of hose shall have inlaid in the rubber cover in three places, namely, midway between the ends and within 10 feet of each end, a brand showing the name of the manufacturer, the month and year of manufacture, the trade name of the hose, and the legend "Wrapped Air 125 lb. A.S.T.M. Specifications".

V. Inspection and Rejection

15. (a) The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangements for inspection.

(b) The manufacturer shall afford the inspector representing the purchaser, without charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with these specifications. Tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(c) The purchaser may make the tests to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. But such tests shall be made within 60 days after date of shipment and at the expense of the purchaser.

16. (a) If the sample fails to meet the requirements of Section 9 the lot from which it was taken shall be rejected.

(b) If the sample fails to meet the requirements of either Section 10 or 11 two additional samples shall be tested. If either sample fails the lot from which it was taken shall be rejected.

17. Samples of rejected hose shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the test, the manufacturer may make claim for a rehearing within that time.

Cotton Rubber-Lined Fire Hose for Public Fire Department Use

1. The specifications apply to 2½, 3 and 3½ inch, double jacketed cotton, rubber-lined fire hose for use in public fire departments.

I. Manufacture

2. (a) The two jackets shall be well, evenly and firmly made from good cotton, as free from unsightly defects, dirt,

knots, lumps and irregularities of twist as is consistent with good manufacturing practice.

(b) Each cotton jacket shall be seamless and have the fillers woven around the hose throughout its length and the warps interwoven with and covering the fillers. The two jackets may be separate or interwoven.

3. (a) The lining shall be made of a properly vulcanized rubber compound which will comply with all the tests specified in Section 7. It shall consist of not less than three calendered sheets in one solid body and shall be lap-jointed with the lap as small and as neat as is consistent with good results.

(b) The lining shall be smooth and practically free from pitting and other imperfections and from corrugations.

(c) The lining shall be of uniform thickness and within the following limits of thickness exclusive of backing:

Internal Diameter of Hose, inches	Minimum Thickness, inches	Maximum Thickness, inches
2½	0.058	0.072
3	0.058	0.072
3½	0.072	0.095

(d) The backing, if used, shall not exceed 0.028 inch in thickness. It need not be of the same composition as the rubber lining but the adhesion between the rubber lining and the cotton jacket shall comply with the test specified in Section 8.

4. The hose shall be flexible and easily coiled.

5. The character of the workmanship shall be such as is incident to good manufacturing practice.

II. Physical Properties and Tests

6. The tests necessary to determine the physical properties which are prescribed in the following sections shall be made in accordance with the appropriate section of those numbered from 17 to 26 inclusive, of Standard Methods for Testing Rubber-Lined Hose (Serial Designation D-15) of the American Society for Testing Materials.

7. (a) The tensile strength shall be not less than 1600 lbs. per square inch when tested one month or less from date of final vulcanization and not less than 1200 lbs. per square inch when tested more than one month but not over one year from date of final vulcanization.

(b) The tensile strength after subjection to a dry heat of 158 deg. F. (70 deg. C.) for a period of four successive days of 24 hours each shall be not less than 900 lbs. per square inch. This test shall be made within three months or less from date of final vulcanization.

(c) The elongation when rupture occurs in making the tensile test (7 a) shall be not less than 2 to 12 inches when tested one month or less from date of final vulcanzation and not less than 2 to 10 inches when tested more than one month but not over one year from date of final vulcanization.

(d) The permanent elongation or set following a stretch of 2 to 10 inches shall not exceed 25 per cent when tested one month or less from date of vulcanization. When tested more than one month but not over one year from date of final vulcanization, the stretch shall be 2 to 8 inches instead of 2 to 10 inches.

8. The adhesion between the lining and the cotton jackets shall be such that the rate of separation of the lining from the jackets of a test piece 1½ inches in width shall be not greater than one inch per minute with the application of a weight of 12 lbs.

9. (a) Each length of hose shall be subjected to a hydrostatic pressure of 400 lbs. per square inch for five seconds without leaking in the hose or at the couplings or breaking any threads in the jackets.

(b) A 3-ft. sample in every lot of 3000 feet of hose or less shall, while lying either straight or curved to a radius of 27 inches withstand without failure a hydrostatic pressure of 600 lbs. per square inch.

(c) One full length in every lot of 500 feet of hose or less shall, while kinked, withstand without failure a hydrostatic pressure of 300 lbs. per square inch for 2½ inch hose and 250 lbs. per square inch for 3 inch hose applied for 5 seconds.

10. The elongation of the hose when tested as prescribed in Section 9 (a) shall not exceed 9 per cent of the length measured under a pressure of 10 lbs. per square inch.

11. The hose shall not twist more than 15 deg. per foot when tested as prescribed in 9 (a). The twisting shall be in the direction which will tighten rather than loosen the couplings.

12. When subjected to the test prescribed in Section 9 (a), the hose shall not rise from the level of the test table or test floor, or warp more than 20 inches from a straight line drawn from center to center of the couplings.

III. Chemical Properties and Tests

13. The chemical tests required by the following chemical specifications shall be made in accordance with the appropriate section of those numbered from 1 to 16 inclusive, of Standard Methods for Testing Cotton Rubber-Lined Hose. (Serial Designation D-15 of the American Society for Testing Materials.)

14. (a) In the analysis of the rubber lining, the acetone extract shall not exceed 4 per cent; the alcoholic potash extract shall not exceed 1½ per cent; the chloroform extract shall not exceed 2 per cent; the ash shall be not less than 50 per cent nor more than 57 per cent; the total sulphur (excluding barytes) shall not exceed 4 per cent; and the free sulphur shall not exceed 1¼ per cent. All percentages shall be by the weight of the total compound.

(b) The sum total of the results of the tests of the rubber lining for acetone extract, alcoholic potash extract, chloroform extract, ash and total sulphur (exclusive of barytes) shall not exceed 67 per cent by weight of the total compound.

IV. Dimensions and Weights

15. The hose shall have an internal diameter not less than 2½, 3 or 3½ inches as ordered and shall be furnished in lengths averaging 50 feet.

16. The weight of each 50 foot length of hose complete with couplings shall not exceed the following limits:

Internal Diameter of hose,	Maximum Weight per 50-ft. length
inches	pounds
2½	70
3	93
3½	115

V. Couplings

17. Couplings shall be as ordered but unless otherwise specified they shall conform to Sections 18 to 23 inclusive, and Section 26.

18. The couplings shall be made, finished and fitted in a workmanlike manner throughout. The diameter through couplings shall be according to the size of the hose, namely 2½, 3 or 3½ inches.

19. The couplings shall be of the expansion-ring pattern of ample strength, and of the best form to resist the stress of expanding the binding ring in the coupling, and shall have a tail part sufficiently long to extend ⅛ inch beyond the end of the expansion ring. They shall be fitted with expansion rings of the following lengths:

Internal Diameter of hose, in.	Length of Expansion Rings, in.
2½	1½
3	1¾
3½	2½

20. The couplings shall be made of an alloy of copper, tin and zinc (and lead if desired) of the following proportions:

Copper	not under	83 per cent
Tin	not under	5 per cent
Zinc	not over	7 per cent
Lead	not over	3 per cent

21. The weight of couplings, including both male and female and expansion rings, shall conform to the following minimum requirements:

Internal Diameter of hose, in.	Minimum Weight per set of Couplings, in.
2½	5¾
3	8
3½	12½

22. (a) The couplings shall be provided with rubber gaskets of the same quality as the rubber lining, and accurately fitted.

(b) The couplings shall have, inside each expansion

ring, a rubber washer with inside diameter not less than that of the coupling and thickness not less than the following:

Internal Diameter of hose, in.	Thickness of Washer, in.
2-1/2	3/16
3	1/4
3-1/2	1/4

23. The threads of hose couplings shall be interchangeable with those now in use in the city or town. Wherever practicable the thread should be the "National Standard" thread adopted in 1906 by the National Fire Protection Association.

24. The couplings shall be attached to the hose in a workmanlike manner without cutting the lining or rupturing the cotton jacket. They shall withstand the hydrostatic pressure tests described in Section 9 (a) without the use of tape or rubber tissue as a filler.

Notes

It is recommended that couplings be ordered to conform to the "Standard for Fire Hose Couplings" (see Sections 18 to 23 inc.) and provided with the "National Standard" thread of the National Fire Protection Association. The essential features of this thread are a 60-deg., V thread and the following:

Size of couplings.	Number of threads	Outside Diameter of male threads.
in.	per inch	in.
2-1/2	7-1/2	3-1/16
3	6	3-5/8
3-1/2	6	4-1/4

In many cases where the number of threads and the outside diameters of the male ends do not differ greatly from the Standard, it is possible to render both male and female couplings adaptable for interchange with the Standard by the use of an adjustable tap for the female end or an adjustable die for the male end of the coupling. This tap or die should have the same number of threads per inch as the couplings or nipple to be treated.

In cases where the above change in the existing equipment cannot be made, the hydrant nipples can be equipped with adapters provided with spanner lugs and having a standard male thread on the out-board end.

VI. Marking

25. Beginning at a point approximately 4 feet from the couplings, each 50 foot length of hose shall be stencilled at places in black indellible letters one inch high with the legend "A.S.T.M. Specifications", the name of the manufacturer, the month and year of manufacture and the words "Tested at 400 lb."

26. Both male and female couplings shall be stamped with the name of the manufacturer and the month and year of manufacture in letters and figures not less than ⅛ inch high.

VII. Inspection and Rejection

27. (a) The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangement for inspection.

(b) The manufacturer shall afford the inspector representing the purchaser, without charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(c) The purchaser may make the tests to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

28. (a) Each length of hose that fails in the tests prescribed in Sections 9 (a), 10, 11 or 12 shall be rejected.

(b) In the case of failure to pass the test prescribed in Sections 7 (a), 7 (b), 7 (c), 7 (d), 8, 9 (b) or 9 (c), two additional samples shall be subjected to the test in which failure occurred. If either of these two additional samples fails, the lot of hose from which it was taken shall be rejected.

29. Samples of rejected hose shall be preserved for two weeks from the date of test report. In case of dissatisfaction with the results of the test, the manufacturer may make claim for a rehearing within that time.

Cotton Rubber-Lined Fire Hose for Private Fire Department Use

1. These specifications apply to 2½ inch, single jacketed cotton, rubber-lined fire hose for use in private fire departments.

I. Manufacture

2. (a) The jacket shall be well, evenly and firmly made from good cotton, as free from unsightly defects, dirt, knots, lumps and irregularities of twist as is consistent with good manufacturing practice.

(b) The cotton jacket shall be seamless and have the fillers woven around the hose throughout its length and the warps interwoven with and covering the fillers.

3. (a) The lining shall be made of a properly vulcanized rubber compound which will comply with all of the tests specified in Section 7. It shall consist of not less than three calendered sheets in one solid body and shall be lap-jointed with the lap as small and neat as is consistent with good results.

(b) The lining shall be smooth and practically free from pitting and other imperfections and from corrugations.

(c) The lining shall be of uniform thickness and not less than 0.058 nor more than 0.072 inches in thickness exclusive of the backing.

(d) The backing, if used, shall not exceed 0.028 inches in thickness. It need not be of the same composition as the rubber lining, but the adhesion between the rubber lining and the cotton jacket shall comply with the test specified in Section 8.

4. The hose shall be flexible and easily coiled.

5. The character of the workmanship shall be such as is incident to good manufacturing practice.

II. Physical Properties and Tests

6. The tests necessary to determine the physical properties which are prescribed in the following sections shall be made in accordance with the appropriate section of those numbered from 17 to 26 inclusive of Standard Methods for Testing Rubber-Lined Hose (Serial Designation D-15) of the American Society for Testing Materials.

7. (a) The tensile strength shall be not less than 1600 lbs. per square inch when tested one month or less from date of final vulcanization, and not less than 1200 lbs. per square inch when tested more than one month but not over one year from date of final vulcanization.

(b) The tensile strength after subjection to a dry heat of 158 deg. F. (70 deg. C.) for a period of four successive days of 24 hours each shall be not less than 900 lbs. per square inch. This test shall be made within three months from date of final vulcanization.

(c) The elongation when rupture occurs in making the tensile test (7a) shall be not less than 2 to 12 inches, when tested one month or less from date of final vulcanization, and not less than 2 to 10 inches when tested more than one month but not over one year from date of final vulcanization.

(d) The permanent elongation or set following a stretch of 2 to 10 inches shall not exceed 25 per cent when tested one month or less from date of vulcanization. When tested more than one month but not over one year from date of final vulcanization, the stretch shall be 2 to 8 inches instead of 2 to 10 inches.

8. The adhesion between the lining and the cotton jacket shall be such that the rate of separation of the lining from the jacket of a test piece 1½ inches in width shall be not greater than one inch per minute with the application of a weight of 12 lbs.

9. (a) Each length of hose shall be subjected to a hydrostatic pressure of 300 lbs. per square inch for five seconds without leaking in the hose or at the couplings or breaking any threads in the jacket.

(b) A 3 foot sample in every lot of 3000 feet of hose or less shall, while lying either straight or curved to a radius of 27 inches, withstand without failure a hydrostatic pressure of 500 lbs. per square inch.

(c) One full length in every lot of 500 feet of hose or less, shall, while kinked, withstand without failure a hydrostatic pressure of 250 lbs. per square inch applied for five seconds.

10. The elongation of the hose when tested as prescribed

in Section 9 (a) shall not exceed 13 per cent of the length measured under a pressure of 10 lbs. per square inch.

11. The hose shall not twist more than 25 degrees per foot when tested as prescribed in 9 (a). The twisting shall be in the direction which will tighten rather than loosen the couplings.

12. When subjected to the test prescribed in Section 9 (a), the hose shall not rise more than 4 inches from the level of the test table or test floor or warp more than 20 inches from a straight line drawn from center to center of the couplings.

III. Chemical Properties and Tests

13. The chemical tests required by the following chemical specifications shall be made in accordance with the appropriate section of those numbered from 1 to 16 inclusive of Standard Methods for Testing Cotton Rubber-Lined Hose (Serial Designation D-15) of the American Society for Testing Materials.

14. (a) In the analysis of the rubber lining, the acetone extract shall not exceed 4 per cent; the alcoholic potash extract shall not exceed 1½ per cent; the chloroform extract shall not exceed 2 per cent; the ash shall be not less than 50 per cent nor more than 57 per cent; the total sulphur (excluding barytes) shall not exceed 4 per cent; and the free sulphur shall not exceed 1¼ per cent. All percentages shall be by weight of the total compound.

(b) The sum total of the results of the tests of the rubber lining for acetone extract, alcoholic potash extract, chloroform extract, ash and total sulphur (exclusive of barytes) shall not exceed 67 per cent by weight of the total compound.

IV. Dimensions and Weights

15. The hose shall have an internal diameter not less than 2½ inches and shall be furnished in lengths averaging 50 feet.

V. Couplings

16. Each 50 foot length of hose complete with couplings shall weigh not less than 40 lbs.

17. Couplings shall be of the type ordered but unless otherwise specified, they shall conform to sections 18 to 23 inclusive, and, Section 26.

18. The couplings shall be made, finished and fitted in a workmanlike manner throughout. The diameter through couplings shall be 2½ inches.

19. The couplings shall be of the expansion-ring pattern, of ample strength, and of the best form to resist the stress of expanding the binding ring in the couplings, and shall have a tail part sufficiently long to extend ⅛ inch beyond the end of the expansion ring. The ring shall be at least 1¼ inches in length.

20. The couplings shall be made of an alloy of copper, tin and zinc (and lead if desired) of the following proportions:

Copper	not under 83 per cent
Tin	not under 5 per cent
Zinc	not under 7 per cent
Lead	not under 3 per cent

21. The weight of couplings, including both male and female and expansion rings, shall be not less than 5 lb.

22. (a) The couplings shall be provided with rubber gaskets of the same quality as the rubber lining, at least ⅛ inch thick and accurately fitted.

(b) The couplings shall have, inside each expansion ring, a rubber washer at least 3/16 inch in thickness and with inside diameter not less than that of the coupling.

23. The threads of hose couplings shall be interchangeable with those now in use in the city or town. Wherever practicable and not otherwise specified, the thread should be the "National Standard" thread adopted in 1906 by the National Fire Protection Association.

24. The couplings shall be attached to the hose in a workmanlike manner without cutting the lining or rupturing the cotton jacket. They shall withstand the hydrostatic pressure tests described in Section 9 (a) without the use of tape or rubber-tissue as a filler.

Notes

It is recommended that the couplings be ordered to conform to the "Standard for Fire Hose Couplings" (see Sections 18 to 23 incl.) and provided with the "National Standard" thread of the National Fire Protection Association. The essential features of this thread are 60 degrees V-thread, outside diameter on the male thread 3 1/16 inch and 7½ threads per inch.

In private yards located in cities or towns where couplings having 7, 7½ or 8 threads per inch, and outside diameters on the male ends of not less than 3 1/32 inch or more than 3 5/64 inch are in use, it is possible to render both male and female couplings adaptable for interchange with the Standard by the use of an adjustable tap for the female end or an adjustable die for the male end of the coupling. This tap or die should have the same number of threads per inch as the coupling or nipple to be treated. In cases where the thread in use does not come within the above limits, both with respect to number of threads per inch and outside diameter of threads on male, the hydrant nipples can be equipped with adapters provided with spanner lugs and having a Standard male thread on the outboard end.

VI. Marking

25. Beginning at a point approximately 4 feet from the couplings, each 50 foot length of hose shall be stenciled at two places in black indelible letters one inch high with the legend "A.S.T.M. Specifications", the name of the manufacturer, the month and year of manufacture and the words "Tested at 300 lb."

26. Both male and female couplings shall be stamped with the name of the manufacturer and the month and year of manufacture in letters and figures not less than ⅛ inch high.

VII. Inspection and Rejection

27. (a) The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangement for inspection.

(b) The manufacturer shall afford the inspector representing the purchaser, without charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(c) The purchaser may make the tests to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

28. (a) Each length of hose that fails in the tests prescribed in Sections 9 (a), 10, 11 or 12 shall be rejected.

(b) In the case of failure to pass the test prescribed in Sections 7 (a), 7 (b), 7 (c), 7 (d), 8, 9, (b) or 9 (c), two additional samples shall be subjected to the test in which failure occurred. If either of these two additional samples fails, the lot of hose from which it was taken shall be rejected.

29. Samples of rejected hose shall be preserved for two weeks from the date of test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

The Training of Employees

EMPLOYEE TRAINING By John Van Liew Morris, Phd. McGraw-Hill Book Co., New York, 1921. Cloth, 311 pages, 5½ by 8½ inches. .....$3.00.

This book represents a thorough study of the educational and training methods used by the various corporations in increasing the efficiency of employees. Thirty-five different vocational programs are discussed at length in such a clear and comprehensive manner as to be of especial service to the manufacturer who is contemplating the installation of a practical plan of training for his employees. In addition to this the volume carries a distinct appeal to the man who is interested in the education of employees by the various industries.

The book is divided into four general sections, ie: I. Comprehensive Programs for Apprenticeship and Special Training; II. Programs Emphasizing Apprenticeship; III. Programs Emphasizing Special Training; IV. Programs of Preliminary Technical Instruction.

Of particular interest to the rubber industry is the chapter on "Programs in the Rubber and Automobile Industries". This discusses at length the system adopted by the Goodyear Tire & Rubber Co. including "Flying Squadrons, Apprentice Training, and The Industrial University".

Rubber Goods in the Netherlands and Norway

The following information relating to the markets for rubber goods in the Netherlands and Norway was issued recently by the Bureau of Foreign and Domestic Commerce:

Netherlands

[Vice Consul Charles W. Drew, jr., Amsterdam.]

Until a comparatively recent date the Dutch rubber industry was little developed. There were but three small factories in 1900. Just before the war an expansion began which was accelerated by the needs of the war, when, as it was impossible for Holland to get rubber products from foreign countries, it was forced to manufacture these articles for its own use. In 1919 there were 29 factories in Holland converting raw rubber into finished products of various sorts. Although Amsterdam is a world rubber market, a very small proportion of the crude rubber imported remains in the country for the use of Dutch manufacturers.

Demand for Rubber Tires

There is a difference of opinion among the better known tire importers as to present demand. The majority state that the demand is greater than before the war, due to the increase in the number of automobiles in use. It is estimated that there are now between 5,000 and 6,000 cars in Holland.

American prices as a rule are higher than those of the best-known European makes, and this with the existing exchange situation is working to the disadvantage of American tires.

Several distributors feel that, due to transportation difficulties, manufacturing difficulties, and the present demand, the stocks carried are not sufficiently large.

Clincher tires are used on from 80 to 85 per cent of the automobiles in Holland. Millimeter (millimeter=0.039 inch) sizes prevail. There are a few people who appreciate the advantages of the straight-side tires, and from 10 to 15 per cent of the cars are so equipped. Probably not more than 1 to 2 per cent are fitted with quick detachable rims and tires. Straight-side tires are gaining in popularity and are considered by some the tire of the future.

The principal sources of supply are the United States, England, France, and Belgium. Since 1919 there has been a great increase in the sales of American automobile casings and tubes. Although these appear to be well introduced, solid tires and equipment for motor cycles and bicycles are supplied almost completely by other nations.

Imports of plantation rubber far exceed the exports. There are at the present time large stocks of rubber in Amsterdam, as for some months past sales have been very light due to the fact that New York has been consistently underquoting Amsterdam and London, as well as the eastern markets.

Demand for Rubber Boots and Shoes

There is one Dutch firm now manufacturing rubber boots and shoes. The production is limited, however, and the output is sold only on the home market.

The demand for rubber boots and shoes is met principally by the products from the United States and England, with a few from Sweden. Some French shoes have lately been introduced on the market.

American products enjoy an excellent reputation and imports from the United States surpass those from any of the countries named above. Statistics are not available as to the exact quantities or values being imported, as these articles are grouped under a general classification by the Government in the official trade statistics.

Rubber Goods for Industrial Purposes

There are four or five factories in Holland manufacturing packing and hose for industrial purposes, but belting is not a Dutch product. Considerable packing is imported from England, and German offerings are becoming more numerous daily. Very little American packing is imported, due to the adverse exchange and high freights. Hose is imported from England, Germany, and the United States. Much balata belting is supplied by English manufacturers, while some is imported from the United States. Holland manufactures considerable leather belting.

The demand for belting is said to be small at this time, due to the stocks which are claimed to be sufficient for some time to come.

Market for Rubber Clothing and Druggists' Supplies

England is not only the principal, but almost the entire, source of supply of rubber clothing for Holland. Rubber coats and fabrics of a waterproof nature are not manufactured in the country, and the English products appear to be without competition, except on the part of the Germans, whose products are now being offered in constantly increasing quantities. The exchange situation is acting to the disadvantage of American sellers in most of the above lines. Some druggists' supplies are manufactured in Holland, the remainder coming largely from English and American sources at the present time.

Norway

[Consul General John Ball Osborne, Christiania.]

There has been only one attempt to organize a company for the manufacture of rubber goods in Norway. This attempt was a new venture as the raw product was not to be procured direct from countries of production, but from material such as waste rubber goods purchased in the cities of Norway and rubber wreckage found along the extensive Norwegian coasts. The attempt was not a success, and while the company is still in existence, its output is too insignificant to play any important part in rubber trade in Norway.

Market for Rubber Tires

The rubber tire situation in Norway is of course closely connected with the automobile situation. It must be remembered that Norway is a very small country, that it is a mountainous country with comparatively few good roads, and with no possibility of giving to the automobile the place which it has achieved in a country like the United States. The automobile is, therefore, more or less of a luxury and can never hope to become much more. The Government has placed a high luxury tax on the use of pleasure motor vehicles of all kinds, and the price, increased by reason of the fact that freights, insurance, etc., must be added to the original cost, limits the use of automobiles to a very few classes of persons.

The latest available reports as to the number of automobiles in Norway is dated October 15, 1919. On that date there were only 7,639 motor vehicles registered in the entire country. The total imports of automobiles from October, 1919, to August, 1920, inclusive, amounted to 4,603. It can quite safely be stated that over 75 per cent of the imports of automobiles during the past two years have been from the United States.

From the above it will readily be seen that the market for automobile tires is limited.

Practically all of the well-known makes of automobile tires in the world are represented in the country. The standard French, German, and American makes are ably represented by men who are devoting practically all of their time to the development of the sale of their respective tires. The leading American tires are in the hands of good agents. Other less known American tires, the introduction of which into this market might be desired, would meet with practically the same competition here as in the United States.

A new factor in the sale of automobile tires in Norway is the intervention on the part of the Government with respect to fixing the size of tires which must be used by the various classes of automobiles.

The import statistics are unsatisfactory inasmuch as the returns for rubber tires are included in the same class as rubber soles and rubber floor mats. The imports stated in kilos (kilo=2.2 pounds), of this class for the period 1912 to 1919 were as follows: 1912, 141,722; 1913, 135,163; 1914, 136,471; 1915, 130,107; 1916, 177,706; 1917, 199,475; 1918, 53,435; 1919, 461,918.

Rubber Boots and Shoes

The use of rubbers is more extensive in Norway, comparatively speaking, than in the United States. Rubbers are worn by men, women, and children throughout the rainy seasons.

Fishing being one of the principal industries of Norway, the use of rubber boots is general among the classes of the population engaged therein. In 1917 there were in all 100,936 persons engaged in the fishing industry of Norway.

During the past several years imports of rubbers and rubber boots have been made chiefly from the United States. It seems that no other country has been able to supply them during these years. There seems to be general satisfaction with the American product, and there is no reason why the market should not be kept.

Terms of payment usually depend upon separate agreements made in each case. There is no general rule. American manufacturers have insisted on having the Norwegian purchaser open an account with a New York bank before considering the order. This has led to a considerable amount of dissatisfaction, but the Norwegian importer has been so badly in need of the goods that he has been willing to meet every requirement made by the producer.

Goods are distributed through agents, to whom, as a general rule, exclusive selling rights for the entire country are given. The agent sells to wholesalers, who distribute to retailers.

The imports, stated in kilos, of this class of rubber goods for the period 1912-1919 were as follows: 1912, 140,644; 1913, 178,105; 1914, 225,540; 1915, 218,426; 1916, 234,649; 1917, 107,835; 1918, 4,539; 1919, 56,616.

The market for rubber clothing, hard rubber, insulated wire and cables, soles and heels, toys, matting, friction tape, and miscellaneous rubber goods included under druggists' sundries is not essentially different from that for the other classes of rubber goods. These products are not manufactured in Norway. Under normal conditions with normal freight rates, normal insurance charges, and nomral rate of exchange, there is no reason why the American manufacturer should not have his share of this business. As a general rule, the Norwegian usually buys where prices are cheapest rather than on a quality basis.

The fishing industry creates a demand for rubber clothing. The development of waterfalls for cheap electrical power produces a demand for insulated wire and cables. Norwegian druggists have lately been covering their needs for druggists' rubber sundries in the United States rather than in Germany Whether this condition will continue after Germany has again entered the competitive market is a matter which must be left open.

Terms of payment and methods of distribution of this class of products are quite the same as for the classes treated above.

With regard to imports of this class of products, the official statistics of the Norwegian Government have no separate returns.

Rubber and Rubber Manufacture

"Rubber Manufacture." By H. E. Simmons, Professor of Chemistry, Municipal University of Akron, Ohio. D. Van Nostrand Company, New York. 1921. Cloth, illustrated, 149 pages 7¼ x 10⅞, $4.50.

Much valuable and interesting information on the subject of rubber is to be found within the 149 pages of this book. The author has taught the subject in the Municipal University of that home of the rubber industry, Akron, Ohio. These facts no doubt account for the up-to-date and accurate character of the information given in the book as well as the interesting and clear cut manner in which the facts and principles are presented. The book is a revision of a series of articles that appeared in The Rubber Age in 1917 and 1918.

The subject is introduced by a brief account of the discovery of caoutchouc and its introduction into Europe. The various regions in which rubber is produced in commercial quantities are described at length. These include the Amazon basin of Brazil, the African field and that of Central America. In each case the method of gathering and curing the rubber is given in detail. The subject is made interesting by numerous illustrations showing natives carrying out the various operations of the various processes. Full information is also given as to the cost of plantations, yields of the trees and the cost and efficiency of the labor employed to gather the rubber while the location of the rubber regions is given on maps. Equally full information is given with reference to the rubber plantations, their development and methods.

The scientific principles involved in the handling of rubber are unusually well discussed. A chapter is devoted to the explanation of the properties of this very common and interesting form of matter. The Brownian movements, surface tension and cataphoresis and electro-endosmos are all explained in a simple and interesting way. The theoretical foundation having been laid, the colloidal action of crude rubber and its application in rubber manufacture is discussed. The different means of coagulation of rubber from the latex are then presented from the scientific point of view as well as the action of smoke and acid, and the analysis of the rubber produced by different methods.

The chemical composition of rubber is fully given. The chemical evidence is given showing that the wild caoutchouc must have the constitution of the polymerized isoprene. An equally full discussion is given of the synthesis of caoutchouc. The significance of each test is explained and a table is appended giving the analysis of a large number of samples of rubber from various sources.

The various fillers used in rubber manufacture are then described, these substances being classified as fillers proper, accelerators, substances esential for vulcanization, and pigments. Sulfur is fully discussed as well as such sulfur compounds as the monochloride and dichloride. The methods of use of these compounds are carefully described as well as the method of their manufacture. The various lead compounds used as accelerators are fully described as well as their effect on rubber and the large number of fillers and pigments used in rubber manufacture. An entire chapter is devoted to the manufacture and use of organic accelerators which have recently been found to be so useful in shortening the time required for vulcanization. A chapter is also devoted to the manufacture and use of rubber substitutes.

The process of vulcanization is given considerable attention both from the theoretical and practical side. Under the theoretical discussion chemical formulas are given showing how the sulfur unites with the rubber molecules. The author follows his usual custom of giving the various theories which have been advanced to explain this reaction. The reverse process of removing the sulfur or reclaiming the rubber is also given attention. The older processes which have been devised or patented for this purpose are described as well as the most modern and successful processes.

The preparation of the crude rubber for manufacturing is described with illustrations of the apparatus used, following which the principles of compounding are discussed. The chemical analysis of the manufactured rubber is given in sufficient detail to insure accurate results if the reader has had some experience in chemical analysis. Similarly the methods used in the physical testing of the finished rubber are described. The volume closes with a brief description of the laboratories and equipment of the Municipal University of Akron where the author is professor of chemistry.

Typographically the volume is excellent. It is printed on an excellent quality of paper and is profusely illustrated. The type is clear and the binding and cover serviceable. The general appearance of the volume is decidedly pleasing. While the book is not a complete treatise on the subject it is an unusually clear presentation of the fundamental principles involved. The author is always interesting and the reader is left with a desire for further information. The lines of progress for future development are frequently indicated. It would appear to the reviewer that both the trained chemist and lay reader would find a great deal to interest and instruct them in this volume.

NEWS OF THE INDUSTRY

News -- Personals -- Financial -- Building Activities -- New Products

Automotive Industry Improves

Report of Motor and Accessory Manufacturers' Association Indicates that Automobile and Dependent Industries Have Passed Crisis and Are on the Up-Grade

Improvement in Automotive Industry

"All in all, the members feel that conditions in the automotive industry are quite decidedly improved, and it is the general belief that the improvement will continue."

This sentence from the official report just issued by the Motor and Accessory Manufacturers Association summarizes the trend of sentiment on the current adjustment and recovery of automotive conditions.

The surveys made by the association are regarded as unusually authoritative and impartial, for they are based not on generalities and hopeful expectations, but on the actual facts and financial figures, reported by the members in their credit reports and conferences. From the wealth of detailed and accurate data accumulated by the credit managers and financial executives of several hundred co-operating members, who are the principal makers of parts and units for the automotive industry, the association at its headquarters is in a stragetic position to gauge the developments in the industry with promptness and precision.

One of the outstanding features of this month's survey is the remarkably spirited manner in which the Cleveland district is leading the onward march of industrial recovery in the automotive field. Says the report:

"It developed that in the Cleveland district conditions are much better than elsewhere, as practically all of the car manufacturers in and about Cleveland are working more nearly to full time than elsewhere, and are placing releases and some new orders.

"It was shown that the automotive industry exhibits rather more improvement than other lines of business.

"A number of automobile manufacturers were reported as operating at somewhat more than seventy-five per cent of capacity.

"Payments apparently are somewhat better than they were a month or so ago. Notes are gradually being pared down, and open accounts are being fairly well paid."

Releases for April and May indicate that these months will probably show marked upward trends in the swing back to normal business. The percentage for March was variously estimated, most of the figures being in the vicinity of 25 or 30 per cent, although some members stated that their output was a little more.

Most members reported that in their opinion the improvement was here to stay, although a few seemed to feel that the present increase was merely a spur that would not last.

Significance was seen in the reports from Michigan to the effect that Detroit factories during the month of March recalled 25,694 men. According to the survey of Employers' Association of Detroit, 6,365 of these men returned to work during the week ending March 29.

On April 1 a survey conducted by the Cleveland Chamber of Commerce in co-operation with the United States Department of Labor indicated that automobile plants in Cleveland had 1500 more employes than they had a month ago, a net gain of twenty-four per cent.

Commenting on the March figures and the early April outlook, M. L. Heminway, general manager of the Motor and Accessory Manufacturers Association said:

"We are not throwing our hats up in the air with meaningless talk of a new boom. We calmly recognize, however, a real improvement. The better sentiment in the reports of the unit makers is charged with fundamental significance. A general sense of sane methods and conservative caution is noticeable throughout the industry. This will head off any unwarranted expansion.

"The industry has learned its lesson. From the crucible of experience it has forged a set of new safety brakes, which will not, however, impede legitimate progress and expansion."

The present situation was accurately summarized recently by a writer in the financial section of the New York Tribune who said:

"The slumbering giant of industry—the automobile trade—is beginning to quiver with activity again. After the high tensioned and unprecedented boom up to the middle of last year the herculean infant industry, restrained by general business depression, began to sleep. The zephyrs of spring are now disturbing this repose, the serenity of which was threatened earlier in the year by the stimulus that came from the automobile shows."

Direct Rubber Incorporates

The Direct Rubber Company, of 46 Paterson street, New Brunswick, N. J., has been incorporated at Trenton with $500,000 capital stock by Samuel C. Clark, John J. Moriarty and W. S. Chinery.

Akron Production Increasing

(Special Akron Correspondence)

Production of automobile tires in the Akron manufacturing district is gradually increasing.

The latest announcement comes from the B. F. Goodrich Co., officials of that concern saying that a daily output of 15,000 tires will be reached before the end of April. Reports from the Goodyear Tire & Rubber Co indicate that factory officials there plan to pass the 16,000 tires a day mark before May 1. Encouraging reports also are received from the Firestone Tire & Rubber Co., the Miller Rubber Co. and the numerous smaller plants throughout the district.

The increase in production necessarily means that more men are being added to the company payrolls and unemployment in Akron is showing a decided increase. The companies are making an effort to take back former employes who have homes in Akron.

Akron automobile tire manufacturers see better business conditions for the rubber industry in the reports from Detroit on the output of cars in that city. Reports issued by the National Automobile Chamber of Commerce show March shipments will reach 16,500 carloads in addition to nearly 10,000 cars driven overland. The March production will show an increase of sixty-three per cent over February, it is announced.

This increase in the production of automobiles, necessitating as it does the tires required for original equipment, coupled with an early spring means that rubber factories must start back toward a normal basis to keep abreast the demand for tires.

The rubber industry, it is pointed out by business observers, was among the first to feel the brunt of the American people's buying strike and because of this fact it is bound to be among the first to recover.

The tire business is convalescent now, they say, and things are looking much brighter for it.

Kelly-Springfield Dividend

Cash disbursements on the common stock of the Kelly-Springfield Tire Company was omitted at the meeting of the directors of the company. The usual quarterly dividend of three per cent in stock was declared, however. The stock payment will be made on May 2 to holders of record April 15. The directors also declared the regular quarterly dividend of $2 a share on the eight per cent preferred stock, payable May 16 to holders of record May 2.

One dollar a share has been the prevailing rate of cash dividends on the Kelly-Springfield common issue for some time.

News of the Rubber Association

Tax Committee of Rubber Association Submits Report—New Bulletin Issued—Important Announcements to Members and to the Trade at Large

Report of Tax Committee of the Rubber Association

TO THE DIRECTORS OF THE RUBBER ASSOCIATION OF AMERICA, INC.

Your committee attended the first and second tax conferences held by the National Industrial Conference Board, of which the Rubber Association is a member.

The Conference Board's Tax Committee has made its final report to the Executive Committee of the Conference Board. That executive committee has neither approved nor disapproved the report, but has ordered its publication. The report will receive publicity and will be the subject of discussion at the third tax conference to be held by the National Industrial Conference Board, to be held in New York City, January 21st and 22nd of this year.

Your committee, therefore, makes its report and respectfully requests your instructions as to the attitude to be taken by this committee in behalf of the Rubber Association in appearing at this third tax conference.

Two features of our Federal taxation system stand out with particular prominence as requiring immediate consideration.

1. *The Repeal of the Excess Profits Tax Law*

The repeal of the excess profits tax is practically assured since both political parties are pledged to its repeal and its existence as a peace time form of taxation is generally admitted as without justification.

We favor the repeal of that tax for the following reasons:

A. It is an uncertain source of revenue for the Government.

B. It is difficult to interpret and apply in reference to business.

C. It is inequitable in discriminating between different forms of business organizations, especially in making arbitrary definitions of invested capital as the basis for the tax.

D. It is unfair in its inference that any profits above eight per cent of "invested capital" are excessive.

E. It encourages and forces inflation of prices under conditions of business prosperity and tends toward a confiscation of capital under conditions of business depression.

F. It has encouraged extravagant expenditures by business, particularly during the period when the eighty per cent war profits tax was in force and merely the degree of extravagance has changed with the reduction in rates of taxation.

2. *The Reduction of Surtaxes on Individual Incomes*

The surtax rates on individual incomes should be reduced because:

A. The high rates of surtaxes have not produced for the Government the anticipated revenue.

B. Money ordinarily available for investment in industrial enterprises has sought investment in tax exempt securities instead of in application to the immediate needs and development of industry.

C. They are uneconomic in principle.

From 1916 to 1918 the taxable incomes, represented by persons having incomes of $300,000 and over a year decreased from $922,000,000 to $392,000,000. In fact over $14,000,000,000 are today invested in tax exempt securities with the consequent shortage of money for industrial enterprises.

The high surtaxes have not only caused a shortage of funds for investment in industrial enterprises, but have been a large factor in obliging business corporations to increase their rates of interest and dividends, all of which has merely resulted in further increasing the cost of living without actually taxing the individuals who have enjoyed the larger incomes.

The adoption of the two foregoing suggestions, which are approved in the report of the Tax Committee of the National Industrial Conference Board, will mean a loss in revenue for the Government of over $1,000,000,000 a year. Upon the basis of $4,000,000,000 being required annually for governmental needs, this loss must be made up from other sources.

We believe that the first action by Congress should be the elimination of unnecessary departments of the Government, increased efficiency in the essential remaining departments and in general a businesslike system of organization, which will reduce expenses and thereby diminish the amount of revenue required for the operation of the Government.

Tariff Revision

We believe that the next step by Congress should be the adoption of a tariff measure, which will increase customs duties.

This action should be taken primarily for the protection of American workers, realizing that the debt of our allies, amounting to over $10,000,000,000 can only be paid in goods, since neither gold nor securities are available for the purpose.

The problem of domestic taxation should be approached by Congress from a combined standpoint of a business proposition for the Government and a business proposition for the ultimate taxpayer, who in practically all instances must be the consuming public, since almost every tax on business must be passed on as a cost of doing business or otherwise must be a tax on capital.

In this respect we point out that any tax on business income is an income tax in name, but not in fact. Realizing that the taxes which business pays in one year are based upon the earnings of the preceding year and largely represent paper profits of that year, any business must either include the taxes paid in the prices to be charged in the year in which the taxes are paid or must pay the taxes out of capital or money borrowed for the purpose.

In the first event the so-called income tax is merely an inflated consumption tax borne by the consuming public and in the second case the tax is one on capital measured by the income of the preceding year.

Appreciating this effect of taxation of business income, we do not approve the recommendation of the Tax Committee of the National Industrial Conference Board, that there be a maximum tax of sixteen per cent on the net income of corporations, but rather that the rate of the corporate tax should not exceed the existing rate of ten per cent and preferably should be much lower.

The members of the Rubber Association have had two years' experience with sales taxes upon automobile tires, tubes and accessories.

In answer to a questionnaire sent out by the association to learn the attitude of members on the subject of a sales tax, every rubber goods manufacturer who replied, gave his approval of a sales tax, but the number of replies received does not justify the conclusion that all members of the association approve such a form of taxation.

Present Sales Taxes

Under the present revenue law over twenty per cent of the revenue is obtained through sales taxes in one form or another.

The Tax Committee of the National Industrial Conference Board disapproves sales taxes as the form of taxation for general application, but does approve the continuation and extension of similar taxes existing under the present law so that under their plan about fifty-five per cent of the total revenue would be obtained through this form of taxation.

We cannot accept the reasoning of the Tax Committee of the National Industrial Conference Board in disapproving a general sales tax. Every argument of that Committee in favor of the continuation and extension of the present so-called excise taxes is at least equally applicable to the taxation of all sales by all manufacturers, even if it is not practicable to apply a sales tax to all sales,—that is, to sales by wholesalers and retailers as well as by manufacturers.

In the report of the Conference Board Committee the chief argument against a general sales tax on gross sales or turnover is that such a tax would be cumulative in effect and would unfairly burden the small manufacturer engaged in but one process as compared with the larger competing manufacturer engaged in several processes from raw material to finished product, the finished article of the latter bearing a smaller total tax charge than the article which passes through the stages by separate manufacturing processes.

That argument impresses us as apparent rather than real. The effect can be avoided by various methods. We suggest the following method with which the rubber industry is familiar:—

Impose the tax upon the manufacturer who finished the article and sells it in a state for final use or consumption.

This is done under the existing excise tax law. For illustration, automobile parts and accessories are not taxable if sold to a manufacturer of automobiles or accessories for incorporation in a finished article, the sale of which is taxable.

As a result of the present law taxing income four taxation peaks are created in each year when financial arrangements must be made for paying the tax based upon the paper profits of the preceding year. The undesirable effects resulting from this situation are avoided by a sales tax which makes the taxes payable at twelve periods based on current business.

We believe that the experience of manufacturers in our industry who have observed the sales taxes under the present law, justified the adoption of a form of sales tax having general application or at least application to all manufacturers without discrimination or exception.

The fundamental consideration which should govern in tax legislation should be a law which will provide the widest possible distribution of the burden of taxation and because the report of the Tax Committee of the National Industrial Conference Board does not recognize this consideration in its practical suggestions, we cannot give our support to that report as a whole.

Many organizations and individuals are supporting a general sales tax in one form or another and we believe that the Rubber Association should join with those parties in supporting a sales tax since our experience has proved that that form of taxation is the easiest of interpretation for business, simple in administration for the Government, a business like system since it provides revenue for the Government monthly out of current business, fair to the public as it can be passed on in its entirety and without inflation and even if it cannot be passed on in the price to be obtained for the article, in this respect it is no more harmful than the present law providing for the taxation of corporate income.

Conclusions

Your committee recommends:

1. The repeal of the excess profits tax law.
2. The reduction of surtaxes on individual incomes.
3. The elimination of all unnecessary expense in the operation of the Government.
4. The adoption of a more adequate tariff measure.
5. The retention of the income tax on corporate income at a rate not to exceed ten per cent.

There are various other suggestions of less general importance which your Committee has considered and favor, but which we do not feel necessary to incorporate in this report.

E. C. Van Cleef, Chairman
E. S. Kochersperger
Kennedy M. Thompson,
Tax Committee.

New Bulletin Service

The Rubber Association of America, Inc. recently issued the initial number of "The Rubber Industry", a newly designed bulletin for the information of the firm and affiliated members of the association. "The Rubber Industry" will be distributed at intervals of two weeks, or oftener should necessity demand, and will seek to cover subjects of general interest to the members. Among the subjects to be taken up are the following: legislation, taxation, traffic and transportation (rail and highway), industrial relations, foreign commerce, raw materials, statistics, association activities and meetings and miscellaneous information.

The multigraphed bulletins now in use will be continued to provide for such news as requires immediate transmission.

Rubber Association Handbook

The association announces that it will shortly issue the Association Handbook for 1920 to all its members and to others who may be interested. The handbook will contain information regarding membership in the association, the various committees and divisions, the constitution, and by-laws and like information. Reports of the annual meeting, annual dinner and reports of the work of the several committees and divisions will not be included.

Proof of Exportation

The Tax Committee of the Rubber Association of America is interesting itself in the requirement in Article 43 of the Revised Regulations 47, relating to "Proof of Exportation" that the proof must include a statement that the article has been received by the foreign consignee, the approximate date of receipt and brief reference to the source of the exporter's information. It has been suggested that this is an impractical and unreasonable requirement for reasons which are undoubtedly obvious to any manufacturer engaged in export trade. The Tax Committee of the association has asked the Bureau of Internal Revenue for an opportunity to confer and present the situation from the manufacturer's point of view.

Revision of Regulations 47 on Excise Taxes

Treasury Department Regulations 47 covering excise taxes have been revised as of December 1920 and reissued. Copies of the new pamphlet have been distributed by the association to all manufacturers of tires, tire sundries, mechanical goods and rubber sundries, with the thought that those are the only branches of our industry which are concerned with the excise tax regulations. However, if other members of the association are interested or if any member desires additional copies of the regulations, they may be obtained promptly from the association office.

Classification Ratings on Rubber Heel and Jar Rings in Eastern and Southern Territory

The Railroad Classification Committee having jurisdiction in Eastern territory recently proposed increases in the classification ratings on rubber heels in carloads and fruit jar rings in carloads. Through representations made to the railroads by the association's Traffic Committee it has been decided that no increases in these rates should be made at this time.

Heretofore no carload ratings have been in effect on fruit jar rings from Eastern manufacturing points to Southern consuming destinations, and as a result of the efforts of the Traffic Committee of the association, the Southern Classification Committee has granted the application for the establishment of carload ratings on fruit jar rings on basis of fourth class.

Rates on Pneumatic and Solid Tires to Pacific Coast Territory

In view of the recent general increases in rates granted by the Interstate Commerce Commission, the rates on pneumatic and solid tires from eastern manufacturing points to Pacific Coast territory have been greatly increased and it will probably be desirable to ship a major portion of the traffic to Pacific Coast points via the Panama Canal.

The Traffic Committee has opened negotiations with the carriers serving the Pacific Coast territory with the object of securing a reduction in westbound rates that will place them on a competitive basis with the rates via the Panama Canal.

Statistics on Mechanical Goods, Bicycle and Motorcycle Tires

Knowledge of the benefits derived by tire manufacturers from the compilation of monthly data respecting the inventory, production and shipments of pneumatic casings, inner tubes and solid tires has led to interest in a similar activity on the part of mechanical rubber goods manufacturers and the manufacturers of bicycle and motorcycle tires (which are not embraced in the tire statistical report now being compiled each month by the association).

At this time, it is quite probable that the Mechanical Rubber Goods Manufacturers' Division will arrange to inaugurate a plan for the monthly reporting by members of their sales of a few of the principal items in the mechanical goods line and that the cycle tire manufacturers will arrange to do likewise with respect to bicycle and motorcycle tires.

Milford Plant Will Not Move

William T. Rodenbach, treasurer of the Goodyear Metallic Rubber Shoe Company, has issued a statement declaring erroneous the report that the branch of the United States Rubber Company located in Milford, Conn., is to be moved to Naugatuck. Mr. Rodenbach declared that while work will be suspended indefinitely in that plant in the near future, no plans have been made for the removal of that plant to Naugatuck. The Milford plant during the war manufactured gas masks and army rubber coats and several observation balloons. Other articles manufactured include traveling bags, belt purses and rubber accessories. The lease on the present plant expires July 1.

Rubber Products Committee Meets

Eighteen members of Committee D-11 on Rubber Products, of the American Society for Testing Materials, attended a meeting which was held in the Engineering Societies Building, New York, on March 28 ,at which time a number of subcommittees reported upon the various subjects coming within their jurisdiction.

The meeting was called to order shortly after 2 p. m. by Chairman F. M. Farmer following which the minutes of the previous meeting were approved as read. The chairman then stated that it was the intention of the American Society for Testing Materials to issue a quarterly bulletin which would include notices and information as to the progress of the work of the various committees.

The secretary then reported that the letter ballot on the proposed tentative specifications for rubber gloves for electrical workers had resulted in twenty-one votes for the specifications and that there were no votes against them, five members did not vote and three did not reply. (An outline of the specifications in question appeared in THE RUBBER AGE, issue of March 25.)

The chairman of Sub-Committe I on Air Hose then reported that the proposed tentative specifications covering wrapped and braided air hose had been prepared. These were discussed and amended and provision was made for the addition of a section covering rejections to be approved by Chairman Farmer. The revised specifications were ordered to be submitted by letter ballot. (These specifications will be found in detail elsewhere in this issue.)

E. A. Barrier, chairman of Sub-Committee II on Cold Water Hose, then stated that the sub-committee had agreed upon the specifications in accordance with the resolution of the committee. These also were ordered submitted to letter ballot. Announcement was then made to the effect that tentative specifications for Sub-Committee V on Insulated Wire and Cable were being prepared.

Letters were then read expressing a desire that Sub-Committee VI on Pump Valves reconsider its action and attempt to prepare specifications covering pump valves. Following a discussion it decided that this sub-committee be re-constituted. The chairman then announced the following appointments to this sub-committee: H. J. Force, chairman; W. C. Hayman, C. Bockius and R. E. Newcomb.

Chairman J. B. Young, of Sub-Committee VII on Steam Hose, then stated that the sub-committee was awaiting the outcome of the conference between the M.C.B. and the Rubber Manufacturer's Specification Committee in reference to the revision of the M.C.B. specifications.

Chairman J. M. Bierer, of Sub-Committee IX on Rubber Insulating Tape, then reported that the tentative specifications for adhesive tape for electrical purposes had been revised and it was accordingly moved that they be submitted to letter ballot as revised tentative specifications.

Reference was then made to the proposed investigation by the Bureau of Standards of rubber products and the request of the committee that the artificial aging of rubber be first considered. It was decided to appoint a special committee to work with the Bureau upon this subject. In accordance with this decision the following sub-committee was announced: P. L. Wormeley, chairman; C. R. Boggs, W. C. Hayman, E. B. Curtis, J. M. Bierer and W. W. Evans.

Chairman Farmer then announced that the next meeting of the committee would be held at Asbury Park, N. J., June 21-24 Following this announcement the meeting was adjourned.

Conditions in France and Germany

B. G. Work, president of the B. F. Goodrich Rubber Co., who recently returned from his annual inspection of the

BERTRAM G. WORK

company's interests abroad, summarizing his observations in France and Germany, said:

"Industrially, Germany makes a better appearance than I noticed on my visit a year ago. Since then factory conditions have materially improved. There appears sufficient food, though not an abundance, and the spirit of the people has changed for the better. The meat restriction was removed November 1, and that commodity seems plentiful now, although prices are high.

"Labor conditions are very good. I noticed one German concern offering for sale coal which had been delivered to France by Germany. Apparently France is not in a position to make immediate use of the supply delivered. Coal costs the Germans 180 marks a ton premium.

"From the social standpoint France has improved, but business is bad. Their motor industry has been hard hit. With gasoline at 80 cents a gallon, economy can naturally be expected. During the last two months there have been distinctive signs for better conditions in France. Paris appears optimistic and bankers see decided signs of improvement."

Foreign Trade Bureau Established

In accordance with resolutions adopted by the executive committee of the Foreign Trade Division, the Rubber Association of America announces the addition of a Foreign Trade Bureau to the organization of the association.

The increasing interest which the members have been taking in foreign commerce led the Foreign Trade Division to present to the board of directors a recommendation that the establishment of a Foreign Trade Department be authorized. Following approval by the board of directors the general manager has, in conjunction with the executive committee, arranged for the proper establishment of the department or bureau.

The Foreign Trade Bureau will be managed by P. L. Palmerton, who has presented his ideas on the work of the bureau at two meetings of the executive committee. The members of the committee have given their attention to the service features of the program and have asked Mr. Palmerton to devote his present attention to the following: information bureau, information bulletins, rubber exporters' handbook, straight side tire promotion, translation of rubber goods terms, employment bureau, collection of credit data, listing of desirable forwarders and others.

It is intended to enlarge this program with other services as they may be requested or as the facilities of the bureau may permit.

While it is thought that the present membership of the Foreign Trade Division includes all of the members who are devoting much attention to export trade, the division has voted to extend an invitation to other firm members of the association to become enrolled in the division. The manager of the Foreign Trade Bureau will, upon request, be glad to handle the details of enrollment of firms and recognition of representatives.

Inasmuch as the Foreign Trade Division functions chiefly through its executive committee, the meetings of that committee are always regarded as "open", where a welcome will be extended to a representative of any member of the division. Also, the division will appreciate the privilege of including in its docket, subjects of export interest that any member wishes to suggest. The executive committee has selected the third Friday of each month as its regular meeting date.

Thropp Plans Additions

(Special Trenton Correspondence)

The John E. Thropp Sons Company, of Trenton, N. J., manufacturers of automobile tire molds and tire-making machinery, will erect a forge shop and other additions to the Fair street plant. The company is now making a new tire making machine designed for the manufacture of the cord type of tires. The new buildings are being erected around the old ones and in this manner no time is lost by employes. The Thropp company is the only Trenton plant of its kind making auto tire molds and machinery.

United States Annual Report

The twenty-ninth annual report of the United States Rubber Co., for the year ended December 31, 1920, showed net earnings for 1920 of $21,220,983, equal to $19.75 on the common shares compared with $17,730,237, or $24.18 a share, in 1919. During the year the common stock was increased by the payment of a 12½ per cent stock dividend.

Net sales were $256,150,130, as compared with $225,589,465, in 1919, an increase of $30,560,665, or 13 per cent. Final surplus for the year, after all adjustments, was $4,015,217, while profit and loss surplus on December 31 amounted to $47,325,380, compared with $52,310,163 at the close of 1919, after allowing for the common stock dividend.

Directors declared the regular quarterly dividends of $2 a share on the common and $2 a share on the preferred, both payable April 30 to stock of record April 15.

Net working capital at the close of the year totaled $119,754,658, compared with $134,903,321, a decrease of $15,148,663. Current assets were $187,128,205, as against $161,875,058 in 1919, an increase of $25,253,147; while current liabilities showed an increase of $40,401,810 to $67,373,547.

Increase in current assets is made up largely of inventories amounting to $123,503,130, of which $77,353,921 is finished goods, compared with total inventories of $87,633,690 in 1919. Cash amounted to $14,534,846, against $20,037,646 in 1919; accounts receivable, $46,329,738 against $40,770,428 and notes receivable $2,760,590, against $1,377,339.

The advance in current liabilities is due to $49,405,000 notes and loans, payable, while in 1919 all notes and loans were cleared up when the report was audited. Accounts payable and acceptances amount to $17,968,547, compared with $24,333,719.

Export sales increased 9.66 per cent during the year. During the latter part of the year export business suffered in common with domestic business from greatly reduced buying.

Chairman S. P. Colt says that he feels that adherence to the company's conservative policy will not only insure safety but also makes it reasonable to expect that the profits from business will be adequate to meet all charges and also provide satisfactory earnings upon the capital stock. Colonel Colt said:

"The policy of the company for the coming year will be a continuance of the conservatism exercised in the past. It is not proposed to extend its business by any plan involving new construction or otherwise requiring the outlay of further capital, but with the completion of the much needed enlargement of the capacity of its tire plants it is intended to confine the business within its present facilities and to conserve its assets in conformity with the times."

The consolidated balance sheet of the United States Rubber Co. and subsidiary companies for the year ending December 31, 1920 is as following:

ASSETS

Cash	$14,534,846.15
Accounts receivable	46,329,738.62
Notes and loans receivable	2,760,589.82
Finished goods	77,353,921.59
Material and supplies	46,149,108.89
Notes receivable of employees	7,430,207.04
Common Stock of U. S. R. Co.	2,427,705.49
Securities insurance fund	2,486,920.05
Securities owned, held by a subsidiary company	7,167,536.14
Plants, properties, and investments	177,227,137.18
Prepaid and deferred assets	5,384,985.94
Total Assets	$389,252,696.91

LIABILITIES, RESERVES AND CAPITAL

Accounts payable	$14,094,388.85
Accrued liabilities	3,874,158.18
Notes and loans payable	49,405,000.00
U. S. R. Co. gold bonds, less treasury bonds	58,426,800.00
7 per cent gold notes	6,000,000.00
10 per cent gold notes	26,000,000.00
Canadian 6 per cent gold bonds	2,600,000.00
Reserves	34,540,494.70
Capital stock—preferred	65,000,000.00
Capital stock—common	81,000,000.00
Canadian Cons R. Co., Ltd. stock	277,200.00
Surpluses	54,034,655.18
Total	$389,252,696.91

Gregory Tire in Operation

Word has been received to the effect that the Gregory Tire & Rubber Co., Ltd., Vancouver, British Columbia, has commenced operations. The plant's capacity will be 500 tires and 1,000 tubes daily.

The main building is of reinforced concrete construction, 70 by 180 feet and containing two storeys and basement. Up-to-date machinery to the value of $250,000 has been installed.

Morton Gregory is president and managing director; A. B. Weeks, general manager of the Canadian Northwest Steel Co., Ltd., is vice-president; S. A. Madge is treasurer while Frank Parsons is secretary. Others connected with the firm are as follows: R. O. Kellogg, the superintendent was formerly superintendent for the American Tire & Rubber Co.; F. B. Roesel, foreman of the tire construction department was formerly foreman with the Kelly-Springfield Tire Co.; Martin Nelson is foreman of the mill and calendering department while W. T. Simpson is foreman of the tube and accessory department.

Empire Suffers from Floods

(Special Trenton Correspondence)

The Empire Tire & Rubber Corporation, Trenton, N. J., probably suffers more loss from various kinds of storms than other rubber plants in this section. Besides recent damage by a severe wind storm the company suffers considerable loss when the Assanpink creek, on whose banks the plant is erected, becomes swollen. The company has asked the Trenton City commissioners for immediate relief from floods. Last winter the factory was flooded resulting in a loss of about $240,000, of which amount $90,000 was lost in wages to the employes due to the closing down of the works.

C. Edward Murray, Jr., treasurer of the company, has asked the city commission to remove the bridges spanning the creek so that the water cannot back up. F. R. Batchelder has made an exhaustive engineering study of the situation for the Empire company and pointed out the causes of trouble.

Goodyear Plans Completed

Announcement of the completion of the details of the reorganization and refinancing plan of the Goodyear Tire & Rubber Company was made on April 20 and the public offering was made the following day of a $30,000,000 issue of the company's bonds as the first step in carrying out the programme that has been agreed upon after many months of negotiation and endeavor.

The details of the reorganization and refinancing are as follows:

A banking group composed of Dillon, Read & Co., Goldman, Sachs & Co., the National City Company, Lee, Higginson & Co., the Guaranty Company, the Chase Securities Corporation and Blair & Co. will offer to the public $30,000,000 first mortgage twenty-year 8 per cent sinking fund bonds of the Goodyear Tire & Rubber Company. Provision is made for the retirement by lot on each of the semi-annual interest dates of $750,000 of the bonds, which are to be brought out at 99, at 120 and interest. The company agrees at all times to maintain net current assets equal to 125 per cent of the amount of the bonds outstanding.

Another group will shortly offer to stockholders for subscription $27,500,000 ten-year 8 per cent debentures of the company. The price at which the debentures are to be offered has not been decided.

Approximately $30,000,000 of an authorized issue of $40,000,000 prior preference stock has been taken by the merchandise creditors.

The $65,000,000 old preferred stock remains unaffected by the new programme.

Nine hundred thousand shares of new common stock of no par value are created to be offered in exchange for the old common stock at the rate of one share for each $100 of the old stock.

Proceeds of the sale of the $30,000,000 first mortgage bonds are to be applied to the payment of bank loans and other debts amounting to roughly $18,000,000, and will give the company $11,000,000 in cash. When the plan is carried through the company will show gross current assets of $72,700,000, current debts of only $9,600,000 and cash of $11,000,000. All other debts will have been cleared up, the $9,600,000 remaining representing contract commitments which will not fall due except as deliveries are made of materials ordered.

At the close of the fiscal year ended October 31 the company wrote off $9,970,000 in net income for the year, representing the difference between cost and market value of raw materials in inventory. In the balance sheet as of February 28 a further provision is made amounting to $38,850,000, so that crude rubber in hand and to be received under contracts will be carried at 20 cents a pound and fabric at present market value.

Times Square Changes Name

Notice has been issued that the name of The Times Square Auto Supply Co., Inc., of New York, has been changed to Consolidated Distributors, Inc.

News from the Trade at Large

Recent Portage Appointments—Goodyear Personnel Changes—Warren A. Greene Passes Away—Dunlop Rubber Elects—New Goodyear Truck Tire—Explosion at Miller Plant

Recent Portage Appointments

L. G. Lehousse has been appointed special Pacific Coast representative of the United Rubber Company, a subsidiary of the Portage Rubber Company, Barberton, Ohio. He will have entire charge of the selling of Huskie tires on the Coast. Before his present connection Mr. Lehousse had been Pacific Coast manager for Portage over the two branches at San Francisco and Los Angeles since November, 1919.

B. W. Perks, who has been in charge of the Portage branch in New York City since January, 1920, has just been transfered to the Pacific Coast. Mr. Perks becomes Pacific Coast manager over the Portage branches at San Francisco and Los Angeles, succeeding Mr. Lehousse and will make his headquarters in San Francisco.

The promotion of J. A. Richardson to the position of branch manager over the Philadelphia and New York territories has just been announced by the Portage Tire & Rubber Company. It is a credit to Mr. Richardson's sales ability that he jumped from salesman to branch manager of two of the largest branches in the Portage organization in the short space of eighteen months.

Goodyear Personnel Changes

(Special Akron Correspondence)

Changes in the personnel at the Goodyear Tire & Rubber Co. include the promotion of Fred L. Morgan, for several years manager of the Cleveland branch of that company, to the position of manager of automobile tire sales. Mr. Morgan's appointment follows the announced retirement, at least temporarily, of Harry G. Palmer as manager of tire sales on account of ill health.

Willis T. Behoteguy assumes Mr. Palmer's duties and Mr. Morgan becomes manager of automobile tire sales in his stead with G. E. Brunner as manager of motor truck tire sales.

Warren A. Greene Passes Away

Warren A. Greene, eighty-nine years old, former general manager of the Lambertville Rubber Company, Lambertville, N. J., died on April 11 at his home at that place. Death was due to the infirmities of age.

Mr. Greene was president of the Amwell National Bank, Lambertville, and had been affiliated with the rubber company as general manager for about fifty years having relinquished active duties a few years ago, owing to failing health. The interment was made in the family plot at Providence, R. I. He is survived by a son and daughter.

Spreckels Promotes Brock

R. L. Brock has succeeded Arthur E. Kelley as manager of the San Francisco branch of the Spreckels Savage Tire Company. Mr. Kelley has gone to San Diego to join the factory forces. Mr. Brock has already assumed office.

Mr. Brock has spent considerable time in the factory, and knows the Savage tire as it has grown from the crude rubber up. He is well known in the East, having been well connected with several merchandising organizations, and a host of friends wished him success in his new position as San Francisco manager.

Dunlop Rubber Elects

At the recent annual meeting of the Dunlop Tire & Rubber Corporation the following officers were elected: F. C. Walcott, president; P. D. Saylor, vice-president. general manager and treasurer; R. J. Dillon, assistant-treasurer; S. S. Walcott, secretary and assistant-treasurer. The following directors were elected: L. M. Bergin, F. C. Walcott, P. D. Saylor, J. Western, R. W. Pomeroy, Pierre du Pont, George du Cros and Sir Harry McGowan. Recent reports current throughout the trade are to the effect that work will be resumed on the construction of the plant at Buffalo, N. Y., sometime in the near future.

New Goodyear Truck Tire

(Special Akron Correspondence)

Announcement has been made that the Goodyear Tire & Rubber Co. has developed a new type of solid motor truck tire, the unique feature of which is the use of the company's "all-weather" pneumatic passenger car tire tread.

Adaptation of the diamond block design of Goodyear passenger car tire tread, as a tread principle for the new solid tire, will afford more positive traction for heavy and slower moving trucks and will increase the field of usefulness of solid truck tires, experts claim.

Explosion at Miller Plant

A serious explosion occurred in the cement block house of the Miller Rubber Co., Akron, Ohio, on the morning of April 12 which resulted in the death of one man and serious injury to five others. Owing to the fact that the building was completely wrecked it was well nigh impossible to determine the cause for the blast.

The explosion occurred at 8:10 o'clock shortly after workmen had reported. It is believed the boiler broke, igniting chemicals in an impregnator used to recharge electric batteries. The explosion shook the general Miller plant and residences for a block about the scene. The blast was heard through most of South Akron and was quickly followed by rumors of a gigantic explosion in which scores were reported killed and injured.

The force of the blast broke the windows from stores and houses within a radius of 100 yards. The north and east sides of the building were blown out. Bricks from the front were thrown across Sweitzer ave., which was strewn with glass for more than fifty yards.

NEW PLANT OF DUNLOP TIRE & RUBBER CORPORATION, BUFFALO, N. Y.

New Plant in Production

The Kelly-Springfield Tire Company, began the manufacture of test tires at the Cumberland, Md., plant on April 2. Regular manufacturing of tires has been officially announced to begin April 15, after which the working forces it was said will be increased until a normal output is attained.

There are about 300 tire workers from Cumberland and vicinity including Frostburg and other places of the Georges Creek region, now working in some of the big plants and indications are that some will take employment at the Kelly-Springfield factory.

Hope Opens Canadian Offices

The Harry M. Hope Engineering Company, of Boston, has established offices in the Dominion Express Building, Montreal, to handle their Canadian business. George W. Saunders, London, is Canadian manager.

Netherlands Rubber Market Depressed

According to Consul George E. Anderson, Rotterdam, there was a much larger volume of trade in rubber in the Netherlands in 1920 as compared with the previous year although the year's trading on the whole was unsatisfactory as a result of falling prices and diminishing demand. The buying by the United States of a considerable share of its supplies in the Netherlands market had a marked influence upon the prices. The bulk of the year's business was done in the earlier part of the season. The large imports and exports which characterized the closing months of 1919 was continued in the first few months of 1920. Disturbing factors soon entered, however, including a transport workers' strike in Holland and some difficulty in meeting demand for particular grades. The most serious setback was the decreased demand from the United States. Large purchases had been anticipated from American importers. The stoppage of orders resulted in a general collapse in the market in Holland, which become so serious in the closing months of the year that several important firms had to suspend payments. Imports and exports of rubber, in metric tons (metric ton=2,204 pounds), for 1919 and 1920 were:

Varities	Imports 1919	Imports 1920	Exports 1919	Exports 1920
	Metric tons.	*Metric tons.*	*Metric tons.*	*Metric tons.*
Wild rubber.....	1,271	849	187	1,176
Plantation rubber..	13,614	25,134	9,355	13,296
Old rubber.....	397	91	56	60
Total	15,285	26,074	9,598	14,532

All of the exports of wild rubber went to Germany and Austria in both years. Of the exports of plantation rubber Germany took 7,021 tons in 1920 as compared with 3,869 tons the previous year, and the United States took 5,229 tons in 1920 as compared with 5,058 tons the previous year. Of the imports of wild rubber the past year the Kongo furnished about 35 per cent and Brazil about 40 per cent. The Netherlands Indies furnished 11,422 tons of plantation rubber during the past year, the rest of the imports arriving from various parts of the world.

Rubber authorities in the Netherlands generally have little faith in the project of far-eastern planters to restrict their output the current year for the purpose of keeping up prices. They seem to think that the only hope of better prices is in improved demand, particularly from the United States. Demand from Germany at present is not good and promise of the immediate future is not very satisfactory.

Lomer in Production Soon

Production of tires will be begun at the new Lomer Armored tire plant, New Castle, Ind., during April and shortly after it will be possible to employ 200 men at the factory, it was announced recently by officials of the company following a short conference.

A thorough inspection and test is being made of all the machinery in the plant and it was stated that the manufacture of tires could be started within two days.

Novel Tire Construction

The Burlock non-skid tire presents a new construction by employing coiled wire mesh in the tread of the tire, anchored in the base of the tread in such a manner as to always present to the road surface a series of wire teeth or claws which cut

CONSTRUCTION OF THE BURLOCK TIRE

through the oil and grease on pavements and give a holding or gripping surface to the tread.

The manufacturers of the tire, the Burlock Non-Skid Tire Corporation, 84 Reade Street, New York City, claim the tires to be equal to chains for holding on hard surfaced roads, that they are to a large degree puncture proof.

Exports of Rubber Goods for February

According to statistics recently issued by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce, exports of rubber manufacturers and insulated wire cables from the United States during the month of February, 1921, amounted to $4,300,531. This does not include exports to Porto Rico and Hawaii which amounted to $146,626 for the month. Exports for February, 1921, not including Porto Rico and Hawaii, have fallen off decidedly when compared to exports for January, 1921, which totalled $7,928,262. A decided decrease was also recorded for exports to the abovementioned islands which amounted to $192,002 for January, 1921.

The value of articles exported during February, 1921, not including those to the islands, were as follows: belting, $182,471; hose, $369,210; packing, $96,581; boots, $28,247; shoes, $246,603; druggist's rubber sundries, $106,096; soles and heels, $75,440; auto tire casings, $1,248,540; inner tubes, $140,115; solid tires, $110,724; all other tires, $39,993; all other manufactures of rubber, $532,638; insulated wire and cables, $1,123,873.

Exports to Porto Rico and Hawaii for February were as follows: belting, hose and packing, $12,494; automobile tires, $121,128; all other tires, $1,946; all other manufactures of rubber, $14,058.

Rubber Importations for March

Statistics recently issued by the Rubber Association of America, Inc. indicated that importations of crude rubber for the month of March 1921 had fallen off decidedly as compared to similar figures for March 1920. In like manner importations for the first three months of the year have shown a decided decrease as contrasted to a like period in 1920. According to the statistics importations of crude rubber for March 1921 amounted to 14,416 tons while those for March 1920 amounted to 31,650 tons. Total importations for the first three months ending March 31, 1921 amounted to 37,234 tons while the same period in 1920 showed imports aggregating 85,995 tons. Following are the detailed statistics:

PLANTATIONS

From—	Tons
Rotterdam	105
London	1,308
Singapore	7,509
Colombo	1,834
Belawan-Deli	574
Batavia	200
Sourabaya	427
Tandjong Priok	74
Penang	164
Pt. Swettenham	34
Pt. Dickson	12
	12,241

MANICOBA & MATTO GROSSO

	Tons
Manicoba	3

AFRICANS

From—	Tons
Lisbon	366
India	11
	377

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	1
*Guayule (Mexico)	
	1

PARAS

Manaos	854
Para	933
Iquitos	7
	1,794

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

	Tons
Waste	345
Balata	29
Miscellaneous Gums	7

COMPARISON 1920-1921

	Mch.-1920	Mch.-1921	Total Importations 3 months ending, Mch. 31st. 1920	1921
Plantations	28,533	12,241	76,013	32,973
Paras	2,463	1,794	7,539	3,538
Africans	514	377	1,893	689
Centrals	23	1	399	6
Guayule	114	..	148	25
Manicoba and Matto Grosso	3	3	3	3
	31,650	14,416	85,995	37,234

ARRIVALS PLANTATIONS FOR MARCH, 1921, SHOWING PORTS OF ORIGIN AND ARRIVAL

From	Arrived at	Tons
Singapore	New York	7,509
Penang	New York	164
Batavia	New York	200
Sourabaya	New York	427
Port Dickson	New York	12
Tandjong Priok	New York	74
Colombo	New York	1,784
Colombo	Boston	50
Rotterdam	New York	105
Belawan-Deli	New York	574
London	New York	1,308
Port Swettenham	New York	34
		12,241

ARRIVALS OF PLANTATIONS BY PORTS

Atlantic Ports	
New York	12,191
Boston	50
	12,241

* Importations of Guayule for month of February 1921 were 25 tons instead of 223 tons shown in report covering February.

MARKETS

Manufactured Rubber Goods

NEW YORK, APRIL 16, 1921

Advices from leading rubber manufacturing centers indicate that production is being rapidly resumed on a larger scale. While the industry is still far from a capacity basis, some of the prominent companies are getting close to that figure, and many of the smaller factories already report full-time operations. In some cases, the factories are running three eight-hour shifts in order to catch up with the orders now on their books.

The most important action now being taken by the producers is the liquidation of labor. Most of the manufacturers are adhering to a policy of taking back only their former employes, and those whose work was most satisfactory during the war days are naturally getting the preference. Many of the large firms announced wage reductions on January 1, and these cuts have been supplemented with additional reductions since that time. The general cutting of pay has ranged from 10 to 22½ per cent, and the various rubber centers are now adjusting wages in order to stabilize the market as much as possible.

AUTOMOBILE TIRES

As the spring season progresses, orders for tires are coming to the manufacturers in larger volume. The season this year is fully a month ahead of normal, and tourists and motorists are getting their cars in shape for a busy summer.

The so-called "buyers' strike" which last year paralyzed the market is beginning to let up, and the good effects, if any good effects can come from a calamity, are now beginning to be felt.

Distributors who let their stocks run completely out, and then embarked upon a hand-to-mouth buying policy, are once again coming into the market, and are displaying a little more confidence, although buying is by no means heavy. This buying is being reflected at the various rubber centers, where the plants are speeding up operations generally in order to accomodate the orders on their books, and those which are steadily coming in. The demand at the present time is still mainly for small sizes.

MECHANICAL RUBBER GOODS

Manufacturers report that there is but slight demand for mechanicals, and the market is in an unsettled position. The great let-down in manufacturing activities in various parts of the country has reduced the call for mechanicals, and many factories have not done any replacement buying during the long period of inactivity.

With steamships being laid up from day to day, owing to lack of cargoes, the call for marine specialties has naturally slumped, and business in this line is considerably below normal for this season of the year.

The railroads are doing a little buying of coupling and air-brake hose, but here again heavy buying is forestalled by depressed business conditions. The roads complaint that they are not making expenses is blamed for the small volume of equipment buying which they are now doing.

Most of the manufacturers are pushing the sale of spring hose, and a fair volume of business is reported. Outside of this line, however, there is little business being done. Manufacturing operations are being held down to the minimum, and the producers are devoting their time and efforts to clearing present stocks of made-up goods.

RUBBER FOOTWEAR

The production of rubber heels is showing some increase, and distributors report a better demand. Difficulties which have arisen in past seasons through price-cutting by various distributors have been generally eliminated. One of the largest manufacturers has taken the situation in hand, has done away with his distributors and is exercising direct control. Self policing by the distributing trade is minimizing the evil on other brands.

DRUGGISTS' SUNDRIES

A steady business in the market for surgical supplies is reported, and this branch of the market is nearest normal of any in the drug sundries line. A little export business is being done in rubber gloves and other sundries.

With winter weather in the East apparently a thing of the past, the demand for hot water bottles is slackening. Manufacturers' sales agents report that druggists are still inclined to operate on a hand-to-mouth basis, and considerable difficulty in selling for future requirements is being experienced.

MISCELLANEOUS

Various lines of bath specialties are appearing on the market, and the manufacturers are getting things in shape for the summer rush. New makes of shower baths are coming onto the market, all of them using more or less rubber in their manufacture and installation. Rubber bath mats are also being pushed for sale in conjunction with the showers.

Cottons, Yarns and Fabrics

NEW YORK, APRIL 16, 1921

Considerable interest attached to the conferences held in Washington between Secretary Hoover, of the Department of Commerce, and the War Finance Corporation, on the one side, and Southern bankers and cotton growers on the other. The tight credit situation has been unusually stringent in the South for some months past, due mainly to the large unsold portion of the old crop, this portion being estimated at more than fifty per cent, and the large sums tied up in cotton loans. Some breaking of this deadlock is sought by the Administration in an effort to improve business conditions.

The outcome of the conference was the suggestion that the cotton growers form export associations under the provisions of the Webb-Pomerene law, and that export shipments of cotton be financed by the corporations operating under the Edge law, with the assistance of the War Finance Corporation. While the export outlook is anything but favorable, in view of the adverse conditions of the exchange situation and economic conditions abroad, it is probable that Southern interests will endeavor to move some of their surplus stocks in this manner.

Planting of the new crop is getting under way, and will continue through May. It is yet too early to forecast just how the curtailment movement is progressing, but sales of fertilizer are picking up, having been only 35 per cent of normal early in March, while at the close they had picked up to 50 per cent of normal.

Prices quoted on the New York Cotton Exchange range from 11.88 cents for April to 13.87 cents for March.

PREMIUM STAPLE COTTON

A steady demand for premium domestic cotton is reported from Southern spot markets and sales have shown a little increase during the past fortnight. Prices in the New Orleans market ranged from 11¾ to 17½ cents, the top price applying on strict middling of 1 3/16 inch staple. In the Memphis market, prices ranged from 11 to 22 cents per pound, the top price ruling on cotton of 1¼ inch staple.

The market for Sea Island cotton has shown further weakness, and latest quotations make the Savannah market 40 cents per pound for the No. 2, or extra choice grade. Buying is light.

EGYPTIAN COTTON

Egyptian reports state that the cotton acreage for 1921 will be considerably less than in 1920. The production this year will run largely to the better grades.

Cables from Alexandria quote the market on Egyptian Sakellaridis cotton for prompt delivery at 41 cents per pound, for fully good, and 32 cents per pound for fully good fair, both on c.i.f. terms landed either at Boston or at New York. Buying from the American spinning trade was reported to be very light.

ARIZONA-EGYPTIAN COTTON

Prices on domestic long staple cotton are steadily easing off under the current limited demand. Pima grade of American-Egyptian cotton is offered on the basis of 32 cents per pound for the No. 2 grade and 31 cents per pound for the No. 1 grade f.o.b. New England mill points. In view of the sharp decline in prices during the past six months, it is considered probable that many of the growers in the Southwest will materially curtail their acreage this year in an effort to stabilize the market. At present selling prices, the long staple is going out at less than cost of production.

TIRE FABRICS

Leading manufacturers report that there is no change in the situation, and the market still lacks activity. While tire manufacturers in general are steadily increasing the production of tires, most of the larger interests still have on hand large quantities of fabrics purchased during the boom period of 1920, when many of the manufacturers were compelled to purchase for delivery months ahead, in order to assure themselves of the supplies when needed.

HOSE AND BELTING FABRICS

Hose and belting fabrics continue on the downward grade, and prices are quoted off all along the line. Producers offer single filling ducks at 11½ to 14 cents per yard, card basis, while double filling offers at 15 to 15½ cents. Enameling ducks are quoted at a range of 30 to 32 cents per pound, with shoe ducks held at 37 cents per pound. Producers ask 28 cents per pound for belting ducks and 30 cents per pound for hose ducks.

DRILLS, SHEETINGS, AND OSNABURGS

Although trading has been generally quiet for the past fortnight, there have been some indications of a coming rally in the market, and well-posted trade factors express the belief that the bottom has been almost reached. Buyers who have entered the market during the period have found to their surprise that distress offerings were not as numerous as had been pictured, and buyers have been compelled to pay higher prices than they had looked for in order to secure stocks. Both drills and sheetings have been affected by a little firmer undertone, although actual quoted prices have shown no advance. Osnaburgs were routine throughout the period.

TIRE FABRICS

17½-ounce Sea Island, combed, sq. yd.		Nominal	
17½-ounce Egyptian, combed	—	@	—
17½-ounce Egyptian, carded	—	@	—
17½-ounce Peelers, carded	—	@	—
17½-ounce Peelers, combed	—	@	—

(Note;—In the absence of important trading, all tire fabric prices are temporarily withdrawn by manufacturers.)

DUCKS

Belting (pound basis) lb.	.28	@	—
Hose (pound basis) lb.	.30	@	—
*Enameling lb.	.30	@	.32
Shoe Ducks lb.	.37	@	—
Single filling yd.	.11½	@	.14
Double filling yd.	.15	@	.15½

*Price varies according to width.

DRILLS

37-inch 3.25-yard yd.	.09	@	—
37-inch 2.75-yard yd.	.11½	@	.12
37-inch 3.00-yard yd.	.10	@	—
37-inch 3.50-yard yd.	.08½	@	—
37-inch 3.95-yard yd.	.08¼	@	.08½

OSNABURGS

30-inch 7-ounce	.07½	@	.08
40-inch 7-ounce	.09¼	@	.09½

SHEETINGS

40-inch 2.25-yard yd.	Nominal		
40-inch 2.50-yard. yd.	.12	@	—
40-inch 2.85-yard yd.	—	@	—
40-inch 3.15-yard yd.	.11½	@	—
40-inch 3.60-yard yd.	.08½	@	—
40-inch 3.75-yard yd.	.07½	@	—
40-inch 4.25-yard yd.	.07	@	—

Note—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload Lots)

7 -ounce 40-inch	Nominal		
7½-ounce 40-inch	—	@	—
7½-ounce 45-inch	Nominal		
8 -ounce 40-inch	4.00	@	—
8½-ounce 40-inch	Nominal		
10 -ounce 36-inch	—	@	—
10 -ounce 40-inch	Nominal		
10 -ounce 45-inch	Nominal		
10½-ounce 40-inch	4.40	@	—

Chemicals and Compounding Materials

NEW YORK, APRIL 16, 1921

Price changes have not been particularly numerous during the past fortnight, and the market is more inclined to become firmer, and while there have not been any noticeable advances in prices, the markets in general were showing more stability.

Some of the smaller rubber manufacturers have come into the market for compounding materials and chemicals, but such buying has been generally limited to small lots, and none of the big buyers have figured prominently in this activity. The large rubber manufacturers are still supplied with enough materials to take care of their requirements for several weeks to come, and it is not believed in the trade that any real buying will take place until late in May, or early in June. However, the increase in the small volume buying by some manufacturers is lending considerable encouragement to the trade.

IMPORTS AND EXPORTS

There has been no check in the volume of the imports, and domestic consumers are still taking foreign compounding materials in a fair way. Despite the bright prospects for the passage of the Fordney tariff bill, however, foreign firms are not increasing their shipments to this country. The foreign goods are not proving a decided factor in the local market, one way or another, being generally available only in limited quantities.

With Congress reconvening, early reconsideration of the Fordney tariff bill is looked for. Chemical and compounding material manufacturers and dealers believe that the bill will put a sharp check on imports when finally enacted.

LITHOPONE

An improved consuming demand for lithopone is reported by leading producers, and the market is showing more firmness on the spot position. Manufacturers using this product are steadily increasing their orders, and producers state that the volume of business during the closing days of March was much better than that during the early part of the month.

ZINC OXIDE

The past fortnight has been marked by the clearing from the local trade of practically all of the distress offerings which have been weakening the market for some time past. Much of the activity in the resale maket has died down as the weak holders have cleared their stocks.

Heavier importations of French oxide are reported, stocks offering at 12⅜ cents per pound for white seal, with green seal offering at 11 cents per pound. Buying of the foreign goods, however, is not large, as the domestic producers are able to undersell. Domestic producers hold their prices quotably unchanged at the basis quoted below.

LITHARGE

An improved inquiry for litharge is reported by producers, and the market is displaying a firmer undertone. Buying by the rubber industry continues to show slow improvement, and the trade is expecting a larger volume of business from this quarter in the near future.

DRY COLORS

Further weakness in dry colors has been noted during the past fortnight and prices are tending downward. German blues are furnishing sharp competition to domestic blues, but with this exception, the imported colors are not proving much of a factor in the New York market.

In the market for blacks, drop shows a recession of ½ cent on the inside price, holders quoting 8 to 11½ cents per pound according to quantity. Other blacks hold nominally unchanged. Blues were also showing weakness, ultramarine being off 2 cents, offering at 10 to 35 cents per pound. Browns showed no material change during the period, although weakness was to be noted in some quarters of the trade. Chrome green shows a drop of 1 cent per pound, being quoted at 36 to 58 cents per pound.

English vermillion is off 10 cents on the inside price, the market being quoted at 90 cents to $1.10 per pound. A wider range of prices on reds is to be noted. Tuscan is 4½ cents off at 17½ to 35 cents per pound, while Indian is 1 cent up on the outside price, at 13 to 16 cents.

WHITING

Some uncertainty as to the status of the whiting market is reported. Some "reclaimed" whiting is said to be on the market and offering at prices materially under

those ruling on the regular article. Gilders' bolted has shown a decline of 5 to 10 cents per 100 pounds during the fortnight, the market being held at $1.35 to $1.45. Commercial whiting holds unchanged at the recent declines, being quoted at $1.20 to 1.30. English cliffstone holds at $1.70 to $1.90. A quiet market demand is reported.

CRUDES

Benzol is quoted downward, the 90 per cent offering at 25 to 28 cents per gallon, while the pure holds at 27 to 30 cents per gallon. Heavy offerings in Central markets have helped to bring about the declines. Demand for toluol is confined to small lots, and the market is quotably unchanged. Cheap lots of phenol are said to be cleaning up from the market, but no change in the quoted price of 10½ to 16 cents per pound is to be noted. Xylol has shown no change during the period, although the undertone has been weak.

INTERMEDIATES

Domestic aniline oil is quoted lower at 20 cents per pound. Supplies are fairly liberal, and buyers are looking for concessions when placing business. Anthracene continues dull, with the market quoted at 85 to 90 cents per pound for the 80 per cent grade. Dimethyaniline has shown a further decline, the market being held at 45 to 55 cents per pound, a drop of 5 cents. Paraphenylenediamine holds unchanged at $2.00 to $2.25 per pound, with the market showing a quiet appearance.

Current Prices for Chemicals, Fillers, Colors, etc.

Acetone, car lots	lb.	11½ @	—
Acetanilid, C. P., bbls.	lb.	.27 @	.28
Acetone smaller lots	lb.	.12 @	—
Acids, Acetic, 56 per cwt.		4.75 @	4.90
Carbolic, C. P.	lb	.09 @	.12
Muriatic, 20 deg.	cwt.	1.50 @	1.75
Muriatic, 22 deg.	cwt.	2.00 @	2.75
Nitric, 40 deg.	cwt.	6.50 @	7.00
Nitric, 42 deg.	cwt.	7.00 @	7.50
Sulphuric, 60 deg. car lots	tons	12.00 @	14.00
Sulphuric, 60 deg. car boys		13.00 @	15.00
Tartaric, crystals	lb.	21.00 @	23.00
Albalith		.30 @	—
Aluminum Silicate		.07 @	.07½
Aniline oil, bulk basis		Nominal	
Contract		— @	—
Imported		Nominal	
Domestic		.20 @	.26
Antimony—			
Oxide	lb.	.07 @	.09
Sulphuret, red	lb.	.25 @	.28
Sulphuret, golden	lb.	.25 @	.30
Sulphuret, crimson	lb.	.40 @	.46
Alcohol, denatured, 190 proof		— @	—
Wood, 95 per cent		.77 @	.82
Ethyl, 190 proof		4.80 @	4.90
Aldehyde, Ammonia		Nominal	
Ammonia, powdered		.08 @	.10
Ammonium Carbonate, domestic	lb.	.08 @	.10
Amyl Acetate	gal.	3.05 @	3.10
Anthracene, 80 per cent		.85 @	.90
Anthroquinine, 95 per cent		1.75 @	2.00
Asbestine		Nominal	
Asphaltum, Egyptian	lb.	.20 @	.25
Domestic	ton	35.00 @	40.00
Barium, dust	lb.	.05½ @	—
Barytes, prime white imported		30.00 @	45.00
white, domestic	ton	24.50 @	26.50
off-color, domestic	lb.	16.50 @	22.00
Southern, f. o. b. mills		25.00 @	27.00
Western, f. o. b. mills		24.50 @	—
Beeswax		.16½ @	.46
Benzidine Base	lb.	.90 @	.95
Benzol, 90 per cent		.25 @	.28
Benzol, pure bulk, 100		.27 @	.30
Blanc Fixe, dry bbls.	lb.	.04½ @	—
Burgundy Pitch, dom.	lb.	.04 @	.04½
Foreign		.60 @	.65
Blacks, Drop	lb.	.08 @	.11½
Ivory	lb.	.11½ @	.45
Carbon, gas, cases	lb.	.10½ @	.20
Lampblack, R. M.	lb.	.17 @	.18
Mineral blacks	ton	30.00 @	40.00
Blues, Prussian	lb.	.60 @	—
Soluble	lb.	.60 @	—
Ultramarine	lb.	.10 @	.35
Browns, Umber, Turkey, burnt powdered	lb.	.05¼ @	.05½
American, burnt	lb.	.04¼ @	.06½
Cadmium, sulphide, yellow	lb.	1.20 @	1.30
Carbon, Disulphide, bulk	lb.	— @	—
Bisulphide	lb.	.06½ @	.07½
Casein, C. P.	lb.	.45 @	.48
Castor Oil		.07¾ @	.11
Caustic Soda, 76 per ct.	cwt.	3.70 @	3.75
Chalk, precipated, extra light	lb.	.02¾ @	.03¼
heavy	lb.	.02¼ @	.02½
China clay, domestic	ton	10.00 @	12.00
imported	ton	16.00 @	25.00
China Wood Oil, bbl.	lb.	.09½ @	.09¼
F. o. b. Pacific Coast		.08¼ @	—
Chloroform, U. S. P.		.40 @	.43
Clay, Dixie	ton	22.00 @	35.00
Blue Ridge	ton	22.00 @	35.00
Coal Tar Pitch		— @	—
Cottonseed Oil, crude, f. o. b. mills	lb.	4.00 @	4.25
Prime summer yellow	bbls.	5.50 @	5.75
		— @	—
Dimethylaniline	lb.	.45 @	.55
Elateron		— @	—
Formaldehyde, spot	lb.	.15 @	.16
Fullers Earth, powd., carload lots		22.00 @	—
Fossil flour	lb.	— @	—
Genasco Mineral Rubber		— @	—
Gilsonite	ton	60.00 @	65.00
Glue, extra white	lb.	.30 @	.40
medium	lb.	.25 @	.30
low grade		.17 @	.19
foot stock		.16 @	.20
brown foots		.16 @	.22
common bone		.13 @	.19
Glycerine, C. P. (drums)	lb.	.17 @	.17½
cans		.18½ @	.19
Graphite, flake (bbl.)	lb.	.14 @	.20
powdered (bbl.)	lb.	.04 @	.10
Greene, chrome, R. M.	lb.	.36 @	.58
Ground glass (fine)	lb.	.03½ @	.04
Hexamethylene	lb.	1.25 @	1.30
Hexamethyenetramine	lb.	.90 @	.95
Infusorial earth, powd'd.	lb.	.02 @	.035
bolted	lb.	.035 @	—
Iron ovide, red, reduced grades	lb.	.13 @	.15
red, pure, bright	lb.	— @	—
Kaolin		— @	—
Lime, hydrated		— @	—
Lead, red dry (casks)	lb.	.09¼ @	.09½
sublimed	lb.	— @	—
White, basic carb		.07½ @	.08
white, basic sulp.	lb.	.07¼ @	.07½
Lime flour	lb.	— @	—
Litharge (casks)	lb.	.08¾ @	.09
English	lb.	— @	—
Lithopone, domestic, bbls.	lb	.07¼ @	—
in bags	lb.	.07 @	—
M. R. X.		— @	—
Magnesia, carbonate	lb.	.15 @	.17
calcined light	lb.	.60 @	.65
Magnesite, calcined, pwd.	ton	50.00 @	65.00
Magnesia, Oxide, heavy		— @	—
Light		— @	—
Extra light		— @	—
Napthalene	lb.	.08 @	.11
Nitrobenzol		.12 @	.14
Naphtha, motor gasoline (steel bbls.)	gal.	.25 @	—
68 @ 70 degrees (steel bbls.)	gal.	— @	—
70 @ 72 degrees (steel bbls.)	gal.	— @	—
73 @ 76 degrees (steel bbls.)	gal.	— @	—
machine (steel bbls.)	gal	— @	—
Oil, corn, crude factory	cwt.	7.76 @	—
corn, ref. (bbls.)	cwt.	9.76 @	—
linseed, (bbls.)		.63 @	—
In carloads, spot		.58 @	.60
Tank cars		.51 @	.53
Oil Palm, Lagos	lb.	.06½ @	—
Niger		.05¾ @	—
Pine, yellow	gal.	1.35 @	1.40
Distilled	bal.	.05¾ @	—
Rapeseed, refined	gal.	1.05 @	—
Rapeseed, blown	gal.	1.14 @	—
Rosin, first rectified	gal.	.40 @	.43
Second, run		.45 @	.48
Tar (commercial)	gal.	.35 @	—
Oleum Acid, 20 per ct.	ton	22.00 @	24.00
Orange mineral, Amer.	lb.	.12¼ @	.14
Imported	lb.	Nominal	
Ozokerite		Nominal	
Paraphenylenediamine	lb.	2.00 @	2.25
Petrolatum, bbls., amber	lb.	.06½ @	—
Pale yellow	lb.	.05½ @	—
Parafin, refined, 118 @ 120 m. p.		— @	—
127 @ 129 m. p.		.09¾ @	.10¼
137 @ 140 m. p.		— @	—
Phenol		.10½ @	.16
Pumis		.03 @	.08
Pine tar kiln	bbl.	13.00 @	—
Pitch	bbl.	14.50 @	—
Plaster of paris	bbl.	4.25 @	5.00
Red Tuscan	lb.	.17½ @	.35
Red (American)	lb.	.08 @	.10
Indian (English)		.13 @	.16
Standard	lb.	— @	—
Rosin (common to good)— 280 lbs.		4.50 @	—
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber, substitute, black	lb.	— @	—
White	lb.	— @	—
Brown	lb.	— @	—
Mineral, Hard Hydrocarbon	ton	35.00 @	45.00
Rosin Oil, first rectified		.40 @	.43
Second rectified		.45 @	.48
Third rectified		.55 @	—
Fourth rectified		.65 @	—
Soda Ash, light 58 pct.	cwt.	1.90 @	2.00
Sodium Nitrite 96 @ 98 pct.		.16 @	.17½
Solvent naptha, crude, hvy.		.25 @	.30
Soya Bean Oil, bbls.		.07 @	—
Sellers, tanks, f. o. b. Coast		.04½ @	—
Stearic Acid, single		.10 @	—
Shellac, fine orange	lb.	.56 @	.57
Shellac			
T. N.	lb.	.45 @	.46
Bleached, ordinary	lb.	.45 @	.46
Bleached, bonedry	lb.	.55 @	.58
Silex (silicia)	ton	12.00 @	35.00
Soapstone, powdered	ton	15.00 @	20.00
Starch, corn, powd.	cwt.	2.68 @	3.16
French	ton	22.50 @	30.00
Jap potato, duty pd.	lb.	.05 @	.05½
Sulphur Chloride, drums		.06½ @	.16
Sulphur, crude	ton	— @	—
100 pounds		— @	—
Roll		2.00 @	2.60
Commercial superfine		2.00 @	2.90
Talc, American	ton	18.00 @	20.00
French	ton	22.50 @	30.00
Thiocarbanilid		— @	—
Tolulol, pure, in drums,	gal.	.27 @	.32
Commercial		.30 @	.32
Tripolite earth	lb.	.01½ @	—
Turpentine, pure gum— Spirit	gal.	.56 @	—
Wood	gal.	.52 @	—
Venice, artificial	gal.	.15 @	.18
True		2.20 @	2.25
Vermillion, English	lb.	.90 @	1.10
American		.25 @	.30
Vorite Rubber Substitute— "Soft"		.14 @	—
"A"		.14½ @	—
"C"		.14½ @	—
"Special"		.14½ @	—
Wax, beeswax, crude, yel.	lb.	.21 @	.22
Refined		.24 @	.25
Bayberry		.25 @	.26
Ceresin, white	lb.	.13 @	.14
Yellow		.12½ @	.13
Whiting, commercial	cwt.	1.25 @	1.30
Gilders Bolted		1.35 @	1.45
Paris, white Amer.	cwt.	1.50 @	1.60
English, cliffstone	cwt.	1.70 @	1.90
Quaker	ton	13.00 @	15.00
Xylol (gal) pure		.40 @	.43
Commercial		.28 @	.35
Zinc Oxide, French process Red Seal		.10 @	.10½
Green Seal		.11 @	.11½
White Seal		.12¼ @	.12½
Leaded Grades— Commercial, lead free		.08¾ @	.09¾
5 per ct. lead sulphate		.08 @	.08½
10 per ct. lead sulphate		.07⅞ @	.08⅜
20 per ct. lead sulphate		.07¾ @	.08½
35 per ct. lead sulphate		.07⅝ @	.08⅛
Zinc Sulphate		.03¼ @	.03½

Crude Rubber

NEW YORK, APRIL 16, 1921

There have been no decisive changes in the crude rubber situation during the past fortnight, and the market continues to display weakness. Fractional advances and declines have been made in day-to-day trading, but no definite trend either way is to be noted at the present time.

Buying by the smaller tire manufacturers has furnished the bulk of the market activity during the period. These smaller interests have concluded the liquidation

of their high-cost rubber months ago, and are now buying on a week-to-week, or a month-to-month basis, according to the policy of the individual company. While the purchases made by these factors are not heavy in individual transactions, the total serves to make up a fair-sized aggregate, particularly in a market where there is little else of general interest.

Manufacturers of other rubber products are not active. Druggists' sundries producers and manufacturers of mechanicals are coming into the market from time to time, but nothing in the way of a consistent buying movement is furnished by either industry. The mechanical goods industry, in New England at least, is said to be operating at from 50 to 60 per cent of capacity, but the manufacturers generally have on hand sufficient stocks of crude to take care of their current requirements.

There is absolutely no speculation at the present time, market factors report. Neither the outside speculative interests, nor the market operators who are usually counted upon to furnish speculative demand are active at the present time. So many severe reverses have been brought on during the past six months as the result of speculation in this commodity, that speculative elements have definitely established a "hands-off" policy.

Importers and dealers state that there is a little improvement in the buying of the larger tire manufacturers. While there have been no heavy orders placed, it is said that the stocks in the bins of some of the largest producers in the country are getting low, and it is believed that these interests are now about ready to re-enter the market for crude. Operations at the large tire factories are being steadily increased, and the industry is expected to be running on a capacity basis by the early summer months. The market is expected to be materially strengthened with the entry of these factors, and it is thought that the manufacturers will buy as cautiously as possible in order to avert the possibility of running the market up on themselves.

Locally, prices are still inclined to vary from ¼ to ½ cent per pound, according to the holder, but the market is more or less nominal throughout. Prices quoted in the New York trade at the close on Saturday were as follows:

Ceylons			
Smoked sheets, ribbed, spot	.16½	@	—
April-June sheets	.17	@	—
July-Sept. sheets	.18½	@	—
July-Dec. sheets	.19½	@	—
Smoked sheet plain, spot	.14½	@	.15
First latex pale crepe	.18½	@	—
April-June latex	.18	@	.18½
July-Sept. latex	.19½	@	—
July-Dec. latex	.20½	@	.21
Amber crepe, No. 1	.15½	@	—
Amber crepe, No. 2	.14½	@	—
Amber crepe, No. 3	.13½	@	—
Clean brown crepe	—	@	—
Light clean brown crepe	.14	@	.14½
Roll brown crepe	.12	@	—
Grand Central crepe	.12½	@	—
Africans			
Loando Niggers	.08	@	—
*No. 1 Benguella	.08	@	—
*No. 2 Benguella	.07	@	—
Lapori Ball	—	@	—
Paras			
Up-river fine	.17½	@	—
Up-river medium	.14	@	—
Up-river coarse	.10¼	@	—
Islands fine	.18½	@	—
Islands coarse	.10¼	@	.10½
***Maderia fine**	.21	@	—
Cameta	.11	@	—
Centrals			
Corinto prime	.10½	@	.10¾
Esmerelda prime	.11⅛	@	—
Miscellaneous			
Guayule wet	.15	@	.18
*Balata block Panama	.34	@	—
Balata sheets	Nominal		
Palembang	.06¾	@	—
Bangermassin	.06¼	@	—
Columbian Block Balata	.43	@	—
Prime Pontianac	.06¼	@	—

*Nominal

Scrap Rubber

New York, April 16, 1921

Continued weakness in the crude rubber market is tending to keep trading in the market for scrap stock down to a minimum, and there has not been any material change during the last two weeks.

Wholesalers of scrap rubber still have large stocks on hand and selling pressure has been exerted in some quarters of the market in an effort to cut down present holdings. Despite the attractive prices named by the jobbers, however, buying by the reclaiming trade is held down to the minimum.

Reclaimers explain that they cannot turn out reclaimed at less than 18 cents per pound. With good grades of crude rubber available at 16 to 17 cents, many consumers who would ordinarily use the reclaimed stock, are now using the crude material exclusively. Under these conditions, reclaimers prefer to keep their plants closed down, or operating in a hand to mouth manner, rather than turn out any shoddy and run the risk of holding it in hopes of an improvement.

Prices quoted by leading sellers of scrap for prompt shipment materials are as follows:

	Cents per Pound		
Solid Tires	1.50	@	2.00
Auto Tire Peelings	2.25	@	2.50
Truck Tires	1.00	@	1.75
Black Rubber	1.50	@	2.00
Boots and Shoes	2.25	@	—
Arctics, trimmed	2.00	@	3.00
Arctics, untrimmed	—	@	—
Tire—Automobile	.50	@	.75
Bicycles, pneumatic	.50	@	.75
Mixed Hose	.50	@	.75
Air Brake	1.00	@	—
Inner Tubes No. 1	6.50	@	7.00
Inner Tubes No. 2	3.50	@	4.00
Red Tubes	2.50	@	4.00

Akron Stock Prices

(Special Akron Correspondence)

A somewhat better demand for rubber shares has resulted in strengthening the entire list of stocks listed on the Akron market.

Goodyear, especially, has been noteworthy for strength since New York bankers announced that refinancing plans were ready for submission to the stockholders. Preferred has climbed to within a fraction of 40 and common is quoted around 13.

Goodrich is a little higher around 38, while Firestone is being held for offers of 90. Holders of Miller common are asking 77.

Following are the quotations on April 15:

	Bid	Asked
Amer. T. & R. com	42	60
do pfd	..	90
Amazon Rubber	..	30
Firestone T. & R. com	85	90
do 6 pct. pfd	84	90
do 7 pct. pfd	75	76
General T. & R. com	150	203
do 7 pct. pfd	75	85
B. F. Goodrich com	37½	38½
do 7 pct. pfd	75	78
do 5 yr. 7 pct. notes	89¾	90½
Goodyear T. & R. com	13	13½
do pfd	37	39½
India Rubber com	100	125
do 8 pct. pfd	..	85
Mason T. & R. com	15½	18
do 7 pct. pfd	55	60
Marathon T. & R. com	3½	4
Miller Rubber com	73	77
do 8 pct. pfd	75	76½
Mohawk Rubber	115	125
Portage Rubber com	16	17½
do 7 pct. pfd	25	34
Republic Rubber com	⅞	1⅛
do 7 pct. pfd	..	15
do 8 pct. pfd	10	12
Rubber Products	..	100
Star Rubber com	..	100
do 8 pct. pfd	..	100
Swinehart T. & R. com	..	40
do 7 pct. pfd	..	70
Phoenix Rubber com	..	20
do pfd	..	90
Standard Tire com	..	125
do pfd	..	90

New York Stock Prices

Following are the New York Stock Exchange quotations on the various rubber stocks listed for April 18:

	Bid	Asked
Fisk Rubber Co.	15¼	15⅜
B. F. Goodrich Co.	37½	38
Kelly-Springfield Tire Co.	40	40¼
Lee Rubber & Tire Co.	26½	27
Keystone Tire	15⅞	15¾
U. S. Rubber Co.	70½	70⅝
do 1st. pfd	100	100¼

American Rubber Patents

ISSUED MARCH 29, 1921

1,372,669—To Martin H. Condry, Detroit, Mich. Cushion-tire.

1,372,757—To Frederick William Lanchester, London, England. Pneumatic tire.

1,372,799—To John J. Cotter, Philadelphia, Pa. Vulcanizing device.

1,372,858—To Samuel I. Baer, Youngstown, Ohio. Combination armor and inner liner.

1,372,887—To John Lardos, Akron, Ohio. Vehicle-wheel tire.

1,372,938—To Peter T. Coffield, La Mesa, Cal. Vehicle-tire repairing.

1,373,094—To Arthur E. Preyer, New York, N. Y. Tire and method of constructing the same.

1,373,228—To William G. Fording, Cleveland, Ohio. Expansible collapsible tire-forming core.

1,373,229—To William G. Fording, Lakewood, Ohio. Expansible and collapsible core for tire casings.

1,373,287—To Albert H. Ammann, Peotone, Ill. Cushion-heel.

1,373,370—To Ernest Veltung, New York, N. Y., assignor to Veltung Steel Tire Co. Resilient tire construction.

1,373,389—To George H. Witsamon, Dayton, Ohio, assignor of one-half to William B. Ruston, Dayton, Ohio. Tire-mold.

ISSUED APRIL 5, 1921

1,373,405—To Frank A. Brown, Indianapolis, Ind., assignor to G. & J. Tire Co. Method of curing and shaping articles of rubberized fabric.

1,373,472—To Harry Weida, Highland Park, N. J., assignor to India Rubber Co. Molded rubber article.

1,373,485—To Owen T. Bugg, Poughkeepsie, N. Y., assignor to Canvas Inner Tube Co. Inner tube for tires.

1,373,807—To Oscar M. Fredd, Hancock, Mich. Vulcanizer.

1,373,834—To John F. Rogers, Dayton, Ohio. Tire-turning tool.

1,373,881—To Michael J. Gillice, Buffalo, N. Y. Armor for pneumatic tires.

1,373,984—To Girolamo Soldani, Spencer Mass. Tire-shield.

1,373,985—To Girolamo Soldani, Spencer, Mass. Combined tire-armor and anti-skid device.

1,374,088—To William H. Miller, Canton, Ohio. Water-bottle.